

33

August 5, 2022 Letting

Notice to Bidders, Specifications and Proposal



**Illinois Department
of Transportation**

**Contract No. 76P95
Various Counties
Section DIST 8 ITS 2023-1
Various Routes
District 8 Construction Funds**

Prepared by

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Checked by

(Printed by authority of the State of Illinois)



- 1. TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. August 5, 2022 prevailing time at which time the bids will be publicly opened from the iCX SecureVault.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 76P95
Various Counties
Section DIST 8 ITS 2023-1
Various Routes
District 8 Construction Funds**

Maintain and service all ITS equipment at various locations throughout District 8 and replacement of the dynamic message board on westbound I-70 at mile marker 16.8.

- 3. INSTRUCTIONS TO BIDDERS.** (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.
- 4. AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Omer Osman,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2022

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

No ERRATA this year.

SUPPLEMENTAL SPECIFICATIONS

Std. Spec. Sec.

Page No.

No Supplemental Specifications this year.

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

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VARIOUS ROUTES
SECTION DIST 8 ITS 2023-1
VARIOUS COUNTIES
CONTRACT NO. 76P95

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2022, the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction of Various Routes, Section Dist 8 ITS 2023-1, Various Counties, Contract No. 76P95, and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

Various Routes
Section Dist 8 ITS 2023-1
Various Counties
Contract No. 76P95

LOCATION OF PROJECT

The location of the project is westbound I-70 at milepost 16.8 and in various locations throughout District 8/Region 5 as directed by the Engineer.

DESCRIPTION OF PROJECT

The Contractor shall repair, replace, maintain, and service the entire Department's Intelligent Transportation System equipment located in District 8/Region 5, including but not limited to the following:

- surveillance cameras, vehicle detectors, dynamic message signs, advanced traffic management systems, fiber optic communications and Ethernet networks, TMC servers, and traffic management center workstations
- All peripheral equipment and scheduled preventative maintenance as directed by the individual work orders issued by the Department's representative

The Contractor shall, also, remove and replace the existing dynamic message sign on westbound I-70 at milepost 16.8 (see special provision).

SUBMITTAL OF EEO/LABOR DOCUMENTATION

Effective: April 2016

This work shall be done in accordance with Check Sheets No. 1, 3, and 5 of the IDOT Supplemental Specifications and Recurring Special Provisions and the "Weekly DBE Trucking Reports (BDE)" Special Provision, except as here-in modified.

PAYROLL AND STATEMENT OF COMPLIANCE:

Certified payroll (FORM SBE 48 OR AN APPROVED FACSIMILE) and the Statement of Compliance (FORM SBE 348) shall be submitted by two methods:

1. By Mail (United States Postal Service): The ORIGINAL of the certified payroll and the Statement of Compliance for the Prime Contractor and each Subcontractor shall be submitted by mail to the Regional Engineer for District 8.
2. Electronically: Scan both the ORIGINAL of the certified payroll and the Statement of Compliance to the same PDF file, and email to the District at the email address designated by the District EEO Officer.

SBE 48 and SBE 348 forms shall be submitted weekly and will be considered late if received after midnight seven (7) business days after the payroll ending date.

WEEKLY DBE TRUCKING REPORT:

The Weekly DBE Trucking Report (FORM SBE 723) shall be submitted electronically. Scan the form to a PDF file, and email to the District at the email address designated by the District EEO Officer.

SBE 723 forms shall be submitted weekly and will be considered late if received after midnight ten (10) business days following the reporting period.

MONTHLY LABOR SUMMARY & MONTHLY CONTRACT ACTIVITY REPORTS:

The Monthly Labor Summary Report (MLSR) shall be submitted by one of two methods:

1. For contractors having IDOT contracts valued in the aggregate at \$250,000 or less, the report may be typed or clearly handwritten using Form D8 PI0148. Submit the ORIGINAL report by mail to the Regional Engineer for District Eight. Contractors also have the option of using the method #2 outlined below.
2. For contractors having IDOT contracts valued in the aggregate at more than \$250,000, the report must be submitted in a specific "Fixed Length Comma Delimited ASCII Text File Format". This file shall be submitted by e-mail using specific file formatting criteria provided by the District EEO Officer. Contractors must submit a sample text file to District 8 for review at least fourteen (14) days prior to the start of construction.

The Monthly Contract Activity Report (MCAR) may be typed or clearly handwritten using Form D8 PI0149.

The Monthly Labor Summary Report and the Monthly Contract Activity Report shall be submitted concurrently. If the method of transmittal is method #1 above, then both the MLSR and the MCAR shall be mailed together in the same envelope. If the method of transmittal is method #2 above, then the MCAR shall be scanned to a .pdf file and attached to the email containing the MLSR .txt file.

The MLSR and MCAR must be submitted for each consecutive month, for the duration of the project, and will be considered late if received after midnight ten (10) calendar days following the reporting period.

REQUEST FOR APPROVAL OF SUBCONTRACTOR:

The ORIGINAL and one copy of the Request for Approval of Subcontractor (FORM BC 260A) shall be submitted to the District at the IDOT Preconstruction Conference.

SUBSTANCE ABUSE PREVENTION PROGRAM CERTIFICATION:

The ORIGINAL and one copy of the Substance Abuse Prevention Program Certification (FORM BC 261) shall be submitted to the District at the IDOT Preconstruction Conference.

The Contractor is required to follow submittal procedures as provided by the EEO Officer at the preconstruction conference and to follow all revisions to those procedures as issued thereafter.

If a report is rejected, it is the Contractor's responsibility to make required adjustments and/or corrections and resubmit the report. Reports not submitted and accepted within the established timeframes will be considered late.

Disclosure of this information is necessary to accomplish the statutory purpose as outlined under 23CFR part 230 and 41CFR part 60.4 and the Illinois Human Rights Act. Disclosure of this information is REQUIRED. **Failure to comply with this special provision may result in the withholding of payments to the Contractor and/or cancellation, termination, or suspension of the contract in whole or part.**

This Special Provision must be included in each subcontract agreement.

ALL HARD COPY FORMS TO BE SUBMITTED TO:

Region 5 Engineer
Illinois Department of Transportation
ATTN: EEO/LABOR OFFICE
1102 Eastport Plaza Drive
Collinsville, IL 62234-6198

Compliance with this special provision shall be included in the cost of the contract, and no additional compensation will be allowed for any costs incurred.

TRAFFIC CONTROL PLAN

Effective: July 12, 1993

Revised: May 12, 1997

Traffic control shall be in accordance with the applicable sections of the “Standard Specifications for Road and Bridge Construction”, the applicable guidelines contained in the “National Manual on Uniform Traffic Control Devices for Streets and Highways”, Illinois Supplement to the National Manual of Uniform Traffic Control Devices, these special provisions, and any special details and highway standards contained herein and in the plans.

Special attention is called to Articles 107.09 and 107.14 of the “Standard Specifications for Road and Bridge Construction” and the following highway standards relating to traffic control:

| | | | | |
|--------|--------|--------|--------|--------|
| 701001 | 701006 | 701106 | 701206 | 701301 |
| 701400 | 701401 | 701406 | 701421 | 701422 |
| 701428 | 701446 | 701451 | 701456 | 701601 |
| 701606 | 701701 | 701901 | | |

In addition, the following Special Provision(s) will also govern traffic control for this project:

- Work Zone Traffic Control Devices
- Traffic Spotters
- Speed Display Trailer
- Traffic Control and Protection for I-70 Westbound

TRAFFIC CONTROL AND PROTECTION FOR I-70 WESTBOUND

This work shall consist of coordinating, furnishing, installing, maintaining, monitoring, relocating, and the complete removal of all traffic control devices necessary to successfully accomplish the closure of the driving lane and adjacent shoulder on westbound I-70 at milepost 16.8 for the removal and replacement of the new dynamic message sign on the existing support, in accordance with the Standard Specifications, these provisions, and as directed by the Engineer.

The Contractor is advised that he or she will be required to complete the removal and replacement of the dynamic message sign within three days utilizing Traffic Control Standards 701400 and 701401 in compliance with the peak hour restrictions shown below.

Any other additional work required to complete the removal and replacement and set up of the proposed dynamic message sign shall be completed under Standards 701101 and 701106.

PEAK HOURS:

Peak hours for westbound I-70 are 6:00 am to 9:00 am.

Should the Contractor fail to have all lanes of Interstate I-70 open to traffic between the hours of 6:00 am and 9:00 am for traffic or conducts operations that will impede the flow of traffic during these hours, the Contractor shall be liable and shall pay to the Department \$1500, not as a penalty

but as liquidated damages, for every 15 minute interval or portion thereof that the flow of traffic is impeded by the Contractor's operations.

The Department will deduct these liquidated damages from any monies due or to become due to the Contractor from the Department.

The Contractor shall notify the Engineer two weeks prior to the anticipated closures. The closure dates must be approved by the Engineer, and said approval will be contingent upon holidays and other events in the area

The cost to comply with this provision shall not be paid for separately but shall be included in the cost of the appropriate traffic control pay items which price shall include furnishing, erecting, maintaining, and removing all traffic control devices.

COMPLETION DATE

All work on this contract shall be completed on or before August 31, 2023. Should the Contractor fail to complete all work by August 31, 2023, the Contractor shall be liable in accordance with Article 108.09 of the Standard Specifications.

WORK ORDERS/START OF WORK

All work to be performed by the Contractor shall be on a call-out basis. Requests for emergency service calls may be initiated by the Department with a telephone call, faxed message, or email and followed by a written work order authorizing the work. The work order shall show the date and time of issuance, type of facility, location, and a description of the service required or the problem reported and pay item(s).

The Contractor shall be available to respond to calls for service at all times, including Saturdays, Sundays, and holidays, to correct any malfunction of equipment or affect any temporary emergency repair to damaged equipment resulting from any cause.

The Contractor shall designate at least two (2) responsible representatives of its organization to whom the Department may issue work orders and instructions. The Contractor shall provide the Department with the names and telephone numbers of these representatives. One of these representatives will be available at all times.

If at the time the service being performed appears to need additional work of a minor nature (not to exceed \$500.00), the Contractor shall proceed with that work. If it appears that the additional work could result in a substantial addition or charge to the current work order, the Contractor shall contact the Department's District contact before proceeding with the additional work.

The date and time the Contractor's work crew arrives at the location on the work order and the date and time the requested work is completed shall be noted on the Contractor's billing invoice submitted to the Department for payment. If the work is not completed on the first trip, the Contractor shall record on the invoice the arrival and departure dates and times for all subsequent work crews until the work order is completed.

The Contractor shall advise the Traffic Management Center Engineer, at 618-346-3285, or the Traffic Operations Engineer, at 618-346-3283, during normal work hours or the District 8 Traffic Management Center, at 618-346-3233, after normal work hours upon arrival or departure of the site of all emergency service calls and provide the status of work. Normal work hours, for the purposes of this contract, shall be hours during which the Contractor is not required to pay overtime labor rates.

QUANTITIES

The quantities specified in this contract indicate the estimated amount of work required for the duration of this contract. This is merely an estimate to allow Contractors to establish unit prices and permit the Department to determine the low bidder. It shall be understood that the unit prices of this contract shall prevail throughout the period of this contract regardless of the quantity.

PARTS AND MATERIALS

Parts and materials supplied by the Contractor, which have a retail value under \$25.00 per unit (including transportation charges paid by the Contractor), shall be considered included with the contract, and no additional compensation shall be paid.

The Contractor shall receive the actual cost for parts and materials supplied, which have a retail value equal to or exceeding \$25.00 per unit (including transportation charges paid by the contractor), to which cost fifteen (15) percent will be added. The actual billing invoices from the suppliers of these items must be submitted as documentation of parts and material costs. When such parts and materials are furnished by the Contractor, the material shall be of the best grade of its respective kind for the intended purpose. The Contractor is expected to make a good faith effort to purchase the parts and materials supplied by them at the lowest possible price. The transportation of parts and materials to the location on the work order by the Contractor shall be considered included with the contract, and no additional compensation shall be paid (except for when a special piece of equipment is required to properly transport the items).

The Department may request the Contractor in writing to pay bills for parts and materials, not to be installed by the Contractor, in accordance with Article 109.04 of the Standard Specifications for Road and Bridge Construction. These materials and parts will be used by the Department in the maintenance of the ITS system.

Parts and materials may be furnished by the Department when available and practical, unless otherwise specified by this contract. Illinois Department of Transportation supplied parts and materials to the location on the work order by the Contractor shall be considered included with the contract, and no additional compensation shall be paid (except for when a special piece of equipment is required to properly transport the items). The Department, at its discretion, may increase or decrease the quantities or kinds of materials supplied to the Contractor. In order to expedite the repair of an installation, the Department reserves the right to deliver parts, materials, and equipment directly to the Contractor's shop or to the jobsite.

CONTRACT GUARANTEE

The Contractor shall guarantee all electrical equipment, apparatus, materials, and workmanship provided under the contract for a period of six (6) months after the date of final inspection according to Article 801.14.

All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operations shall be delivered to the Engineer prior to the acceptance of the project with the following warranties and guarantees:

1. The manufacturer's standard written warranty for each piece of electrical equipment or apparatus furnished under the contract.
2. The Contractor's written guarantee that, for a period of six (6) months after the date of final inspection of the project, all necessary repairs to or replacement of said warranted equipment or apparatus shall be made by the Contractor at no cost to the Department.
3. The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of 6 months after final inspection of the project.

WARRANTIES FOR SUPPLIES AND SERVICES

The Vendor/Contractor warrants that the supplies furnished under this Contract will:

- Conform to the State's manufacturing standards, specification, drawings, samples, or descriptions furnished by the State including, but not limited to, all specifications attached as exhibits hereto.
- Be merchantable, of good quality and workmanship, free from defects for a period of twelve months or longer if specified in writing, and fit and sufficient for the intended use.
- Comply with all federal and state laws, regulations, and ordinances pertaining to the manufacturing, packing, labeling, sale, and delivery of the supplies.
- Be of good title and be free and clear of all liens and encumbrances.
- Not infringe any patent, copyright, or other intellectual property rights of any third party.

Vendor/Contractor agrees to reimburse the State for supplies to meet such warranties. The Vendor/Contractor shall ensure that all manufacturers' warranties are transferred to the State and shall provide a copy of the warranty. These warranties shall be in addition to all other warranties, express, implied, or statutory, and shall survive the State's payment, acceptance, inspection, or failure to inspect the supplies.

LABOR, TOOLS, AND EQUIPMENT

The Contractor shall furnish all labor, tools, equipment, and other incidentals necessary or convenient to the successful completion of work orders and the carrying out of all duties and obligations imposed by the contract.

All Contractor work crews shall be equipped with a cellular telephone to facilitate communications with work crews and to verify operating conditions of essential Intelligent Transportations System facilities. Only the crew leader will be required to be equipped with a cellular telephone. The Contractor shall provide the Department with the cellular number being used in the execution of each work order. The Department reserves the rights to use the cellular telephone to contact a Contractor's work crew for their location and to request a report on the status of a work order. No additional compensation for cellular telephone expenses will be allowed.

Labor rates for JOURNEYMAN ELECTRICIAN and APPRENTICE ELECTRICIAN shall be inclusive of (but not limited too) all regular and premium time, insurance, benefits, overhead, and profit. The Department will specify if the JOURNEYMAN ELECTRICIAN and/or APPRENTICE ELECTRICIAN pay items will be utilized on each individual work order.

The time allowed for the truck pay items included in this contract shall be the actual time the truck(s) is onsite at the work location (while work is underway). Truck rates include (but are not limited to) the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage overhead, profits, insurance, and all incidentals.

JOURNEYMAN ELECTRICIAN

This unit shall be eligible for payment only when labor is performed onsite at the appropriate work location. Labor will be measured to the nearest 0.25 hour for each JOURNEYMAN ELECTRICIAN approved for use on the applicable work order. Labor rates for JOURNEYMAN ELECTRICIAN shall be inclusive of (but not limited to) all regular and premium time, insurance, benefits, overhead, and profit.

The JOURNEYMAN ELECTRICIAN shall furnish all labor, tools, equipment, and other incidentals necessary or convenient to the successful completion of work orders and the carrying out of all duties and obligations imposed by the contract. Also, the JOURNEYMAN ELECTRICIAN shall be required to carry a cellular telephone to facilitate communications with work crews and to verify operation conditions of essential Intelligent Transportations System facilities. The Department reserves the rights to use the cellular telephone to contact the JOURNEYMAN ELECTRICIAN for his or her location and to request a report on the status of a work order. No additional compensation for cellular telephone expenses will be allowed.

This work will be paid for as a part of the contract unit price per HOUR for JOURNEYMAN ELECTRICIAN.

APPRENTICE ELECTRICIAN

This unit shall be eligible for payment only when labor is performed onsite at the appropriate work location. Labor will be measured to the nearest 0.25 hour for each APPRENTICE ELECTRICIAN approved for use on the applicable work order. Labor rates for APPRENTICE ELECTRICIAN shall be inclusive of (but not limited to) all regular and premium time, insurance, benefits, overhead, and profit.

APPRENTICE ELECTRICIAN utilized as part of this contract must follow the criteria listed below:

1. All apprentice electricians shall work within the guidelines of the Apprentice Program.
2. Apprentice electricians may only be utilized for routine maintenance tasks included, but not limited to, traffic camera lens cleaning, filter cleaning and/or replacement, light post inspection and repair, and other various duties associated with routine maintenance.
3. Apprentice electricians may not be utilized for any ITS controller cabinet maintenance or repair. Apprentices are prohibited from performing any work of this nature unless under direct supervision of a journeyman electrician.
4. Apprentice electricians will be allowed to respond to emergency calls to assist a journeyman electrician when needed.
5. Apprentice electricians must be directly supervised at all times by a qualified vendor representative.
6. The Department reserves the right to limit the number of apprentices used in execution of this contract.
7. The Department reserves the right to restrict work performed for this contract by apprentice electricians.

The APPRENTICE ELECTRICIAN shall furnish all labor, tools, equipment, and other incidentals necessary or convenient to the successful completion of work orders and the carrying out of all duties and obligations imposed by the contract unless already provided by the JOURNEYMAN ELECTRICIAN.

This work will be paid for as a part of the contract unit price per HOUR for APPRENTICE ELECTRICIAN.

ITS EQUIPMENT CONTROL TECHNICIAN REMOTE SUPPORT

This work shall be eligible for payment only when it is not practical for labor to be performed onsite, e.g. conference calls or network problems that are quickly addressed remotely. This unit shall be eligible for payment only when a work order requesting remote support is specifically approved by the Department via email. Labor will be measured to the nearest 0.25 hour for each ITS EQUIPMENT CONTROL TECHNICIAN REMOTE SUPPORT approved for use on the applicable work order with a maximum quantity of three hours per work order. Labor rates for ITS EQUIPMENT CONTROL TECHNICIAN REMOTE SUPPORT shall be inclusive of, but not limited to, all regular and premium time, insurance, benefits, overhead, and profit.

This work will be paid for as a part of the contract unit price per HOUR for ITS EQUIPMENT CONTROL TECHNICIAN REMOTE SUPPORT.

PICK-UP TRUCK

The time allowed for the truck pay item included in this contract shall be the actual time the truck(s) is onsite at the work location while work is underway. Truck usage will be measured to the nearest 0.25 hour for each PICK-UP TRUCK approved for use on the applicable work order. Truck rates include (but are not limited to) the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, and all incidentals.

This work will be paid for as a part of the contract unit price per HOUR for PICK-UP TRUCK.

ARROWBOARD (TRAILER MOUNTED)

The ARROWBOARD (TRAILER MOUNTED) shall meet the requirements of Articles 701.15(i) and 1106.02. The time allowed for ARROWBOARD (TRAILER MOUNTED) shall be the actual time the attenuator is in use at the work location. Labor will be measured to the nearest 0.25 hour for each ARROWBOARD (TRAILER MOUNTED) approved for use on the applicable work order.

This work will be paid for as a part of the contract unit price per HOUR for ARROWBOARD (TRAILER MOUNTED).

RESPONSE TIME

The Department will define the expected response times at the time of issuing the work order based on the following:

LEVEL 1 – Emergency Service Calls – Work crew/staff shall be at the location on the work order or remotely logged in within one and one-half hours of notification during normal work hours and within two hours of notification after normal work hours and complete work within 3 hours of arrival. Normal work hours, for the purposes of this contract, shall be hours during which the Contractor is not required to pay overtime labor rates.

LEVEL 2 – Priority Non-Emergency Service Calls – respond within 24 hours of issuance and complete work within 3 days.

LEVEL 3 – Routine Work Items – complete work within 30 days of the date work order was issued.

It shall be the Contractor's responsibility to promptly notify the Department, if for any reason, the Contractor cannot meet either the response time established at the issuance of the work order or the response times established herein.

FAILURE TO MEET RESPONSE TIME/LIQUIDATED DAMAGES

Should the Contractor fail to respond and/or complete a work order on time or such extended time as may have been allowed by the Department, a monetary deduction will be applied to monies due or that may become due to the Contractor. The value of the monetary deduction will be as follows:

For LEVEL 1 (Emergency Service Calls):

| <u>Work Order Amount</u> | <u>Liquidated Damages for Each 15 Minutes*</u> |
|----------------------------|--|
| From \$0 to \$500.00 | \$25.00 |
| From \$500.00 to \$1000.00 | \$50.00 |
| From \$1000.00 and Over | \$100.00 |

*After applicable response time or completion time expires

For LEVEL 2 (Priority Non-Emergency Service Calls) and LEVEL 3 (Routine Work Items):

| <u>Work Order Amount</u> | <u>Liquidated Damages for Each Day*</u> |
|----------------------------|---|
| From \$0 to \$500.00 | \$250.00 |
| From \$500.00 to \$1000.00 | \$500.00 |
| From \$1000.00 and Over | \$1000.00 |

*After applicable response time or completion time expires

For the purpose of calculating the LEVEL 2 and LEVEL 3 monetary deduction, a day shall be any day or portion of, excluding the following:

- A. When adverse weather at the field site prevents work on the controlling item of a work order.
- B. When conditions at the field site due to recent weather conditions prevent work on the controlling item of a work order.
- C. When work on the controlling item has been suspended by an act or omission by the Department or Engineer.

CONTROL OF WORK

The Department will conduct frequent inspections of the respective systems and installations to determine if the servicing is being performed by the Contractor promptly and satisfactorily and in the manner specified in the contract.

The Department reserves the right to require the Contractor to remove any employee from his/her assignment on the jobsite based upon carelessness, insubordination, incompetence, inefficiency, or any other condition deemed to be contrary to the best interest of the State of Illinois.

The Department reserves the right to place maximum or minimum limits on the work force and/or equipment utilized by the Contractor to execute a work order. The Contractor's employees shall be prepared to cooperate with such inspections and shall provide whatever information is requested concerning the work in progress.

CONTRACTOR'S REPRESENTATIVE

The Contractor shall designate a service representative to serve as the key contact person for the Department in the execution of this contract. The service representative shall monitor the daily activities of the contract and be available to discuss and report to any problems that may arise. The services of this person shall be included in the contract, and no additional compensation shall be allowed.

ELECTRONIC MAIL

The Contractor shall have electronic mail receiving and sending capabilities. The Department will utilize these communication mediums to reduce errors in communications, to send/receive work orders, and receive daily contract work activity sheets, various drawings, and estimate sheets as needed. This requirement shall be included in the contract, and no additional compensation shall be allowed.

WORK ITEMS

The Contractor will be responsible for performing typical work items as specified below. The Contractor should expect to be routinely issued work orders for many of the work items described below. The Contractor will be responsible for adhering response times when performing these work items. The following list is not all-inclusive, and its intent is only to give the Contractor information as to what type of work they will be responsible for:

- Inspecting and cleaning surveillance camera installations.
- Cleaning a surveillance camera environmental enclosure and seals.
- Inspecting and cleaning video detector installations.
- Calibrating video detector camera installations.
- Inspecting and cleaning dynamic message sign installations.
- Washing, inspecting, and reinstalling the intake and exhaust filters in truss mounted dynamic message signs.
- Replacing the filters in truss mounted dynamic message signs.
- Inspecting, cleaning, and re-sealing controller cabinet installations.
- Replacing existing controller cabinet locks with new controller cabinet locks.
- Locating and marking the location of underground cables.
- Resetting the power at existing controller cabinet installations.
- Troubleshooting and repairing surveillance camera, video vehicle detector, micro loop detector, fiber optic communication, radio communication, side-fire radar detector, and dynamic message sign locations, so they are back in normal operation and functioning to the satisfaction of the Department's designated Engineer.
- All detectors, cameras, dynamic signs, and highway advisory radio system are controlled by equipment in the Intelligent Transportation System (ITS) equipment room (Rm 120B)

or the traffic management center (TMC) control room (Rm118). This equipment is used to control CCTV surveillance cameras, collect vehicle detector data, provide travel/congestion times to dynamic message signs and highway advisory radio system, manage and disseminate incidents/events, and manage and disseminate DMS and amber alerts after completion. Hardware includes several device inputs and outputs; one video wall controller, one highway advisory radio (HAR) server, one Wavetronix Data Collector and Translator server, one internet work station, two streaming video to web servers, one web server and application, ten Axis video servers, one 360 Surveillance Camerleon ITS server, Cornet and Impath video encoders, Cornet and Impath video decoders, twelve 40" LCD monitors in addition to seven Windows 7 client workstation pc's with LCD monitors, one Tyco video recorder, two Raritan keyboard/video/mouse switches, a minimum of 17 Cisco WS-C2955S-12, 2 Cisco WS-C3550-12G, 11 Cisco WS-3750-12S, 9 Cisco WS-CE500G – 12TC, 10 Cisco IE3000, Ethernet switches and all ancillary equipment including GBIC and SFP modules, and Click 301 serial to Ethernet converters and Wavetronic Click 200/202 surge protectors/power supplies.

- The Contractor may be asked to service or enhance the functionality of any ITS equipment.

ITS CONTROL EQUIPMENT VENDOR QUALIFICATIONS

Minimum requirements include response times as listed, 24/7 on-call service capability, on-line monitoring and intervention capabilities, experience in programming using the existing software, ongoing experience with the hardware of the type installed, and qualified ongoing experience with the software of the type installed. At the pre-construction meeting, the Contractor shall submit for approval to the District 8 Intelligent Transportation Engineer or designee a qualified representative to perform systems support and maintenance of the ITS Control Equipment. The Vendor shall meet the following requirements:

- Have experience in data acquisition, specifically Wavetronic Data Collector, Microsoft Windows server 2005/2008, Cameleon ITS version 2012.
- Have experience in the software environment similar to that of TMC.
- Have 3 continuous years of maintenance and support of similar systems in size and Microsoft environments.
- Have working knowledge of the Cisco Command language and CNA software and have experience in multicast routing.

The Vendor shall submit to the Engineer resumes of the qualified personnel listed to work on the ITS control equipment. Resumes shall list previous projects and specific duties/responsibilities the individuals were responsible for as part of the project. The list shall include the projects' contact person, organization, title, and current phone or e-mail information. The resumes shall be submitted at the pre-construction meeting.

KNOCKDOWN DEBRIS

The debris from damaged ITS equipment such as cameras, detection devices, and dynamic message signs (DMS) shall remain the property of the Department. The Contractor shall transport knockdown debris to the Department's facility at 9601 ST. CLAIR AVE, FAIRVIEW HEIGHTS, IL. This debris can be delivered after each knockdown repair or held at the Contractor's shop and delivered periodically to the Department's facility. The Contractor should notify the Department when knockdown debris is to be delivered, so personnel will be available to direct unloading.

Concrete rubble, broken glass, and other debris of this type shall be disposed of by the Contractor at an approved site off of the State right-of-way.

This requirement shall be considered included with the contract, and no additional compensation shall be allowed.

KNOCKDOWN DOCUMENTATION

The Contractor shall provide the Department with photographs of all onsite knockdown debris to document the damage for third party claims. The photographs may be Polaroid-type instant pictures or digital images and should have the number of views necessary to properly detail the motorist caused damage. Three or more photographs are required for adequate documentation. Identifying information should be included in the photographs as much as possible.

This requirement shall be considered included with this contract, and no additional compensation shall be allowed.

TEST EQUIPMENT

The Contractor shall provide all of its own testing instruments, as required, to service the facilities of the Department.

The Contractor shall use the established procedures as defined by the manufacturer or standard practice to determine the integrity of equipment. The Department shall be provided with the testing procedures used upon request.

All required test equipment shall be included in the contract, and no additional compensation will be allowed.

NUMBERING SYSTEM

The Contractor shall use the Department's Intelligent Transportation Systems numbering system on all reports, correspondence, and billing invoices.

WHERE SERVICES ARE TO BE PERFORMED

Services may be performed at but not limited to the following locations:

| Surveillance Cameras | |
|-----------------------------|--|
| Numerical Location | Textural Locations |
| PSBC00.3A.01C | I-55/64 @ MP 0.3 (PSB) |
| IL300.1A.02C | IL 3 @ 8th St. |
| PSBC00.9A.03C | I-55/64 @ MP 0.9 (Tudor Ave.) |
| MLKB00.7A.04C | MLK Bridge |
| PSBC02.4A.05C | I-55/64 @ MP 2.4 (3rd. St.) |
| 006402.8A.06C | I-55/64 @ MP 2.8 (Merge) |
| 006403.9A.07C | I-64 @ MP 2.9 (15th) (Old 10th/MP 3.1) |
| 006404.5A.08C | I-64 @ MP 4.5 (25th St.) |
| 006405.6A.09C | I-64 @ MP 5.6 (E of 25th St.) |
| 025520.2A.10C | I-64 @ I-255 |
| 557003.8A.19C | I-55/70 @ MP 3.8 (IL 203) |
| 557005.9A.20C | I-55/70 @ MP 5.9 (W of IL 111) |
| 557007.0A.21C | I-55/70 @ MP 7.0 (E of IL 111) |
| 557008.8A.22C | I-55/70 @ MP 8.8 (Fairmont Ave.) |
| 025524.7A.23C | I-55/70 @ I-255 |
| 027001.0A.24C | I-270 @ MP 1.0 |
| 027002.0A.25C | I-270 @ MP 2.0 |
| 027002.4A.26C | I-270 @ MP 2.4 (IL 3) |
| 027003.2A.27C | I-270 @ MP 3.2 (St. Thomas) |
| 027004.5A.28C | I-270 @ MP 4.5 (IL 203) |
| 027005.9A.29C | I-270 @ MP 5.9 (IL 111) |
| 557012.7A.30C | I-55/70 @ MP 12.7 |
| 025530.9A.30C | I-270 @ I-255 |
| 557013.4A.33C | I-55/70 @ MP 13.4 |
| 557014.6A.34C | I-55/70 @ MP 14.6 |
| 557015.9A.35C | I-55/70 @ MP 15.9 |
| 025516.8A.37C | I-255 @ MP 16.8 (IL 15) |
| 025504.4A.38C | I-255 @ MP 4.4 (JB Bridge) |
| 557008.0A.39C | I-55/70 @ MP 8.0 |
| 557005.2A.40C | I-55/70 @ MP 5.2 (Landfill) |
| 557003.2A.41C | I-55/70 @ MP 3.2 (Exchange) |
| PSBC01.7A.42C | I-55/64 @ MP 1.7 |
| 006406.3A.43C | I-64 @ MP 6.3 |
| 025522.0A.44C | I-255 @ MP 22.0 |
| 025523.5A.45C | I-255 @ MP 23.5 (Collinsville Rd) |
| 557010.3A.46C | I-55/70 @ MP 10.3 (W of IL 157) |
| 025525.6A.47C | I-255 @ MP 25.6 (Horseshoe Lk Rd) |
| 025526.6A.48C | I-255 @ MP 26.6 |
| 025527.6A.49C | I-255 @ MP 27.6 |

| Surveillance Cameras | |
|-----------------------------|----------------------------------|
| Numerical Location | Textural Locations |
| 025528.4A.50C | I-255 @ MP 28.4 |
| 025529.3A.51C | I-255 @ MP 29.3 |
| 557012.3A.52C | I-55/70 @ MP 12.3 (DMS) |
| 027000.5A.52C | I-270 @ MP 0.5 |
| 006700.0A.53C | Clark Bridge North End |
| 006700.0A.54C | Clark Bridge South End |
| 007001.4A.55C | I-70 @ MP 1.4 (Industrial Drive) |
| 007001.9A.56C | I-70 @ MP 1.9 (IL 3) |
| XXXXXX.XX.57C | McKinley Bridge |
| XXXXXX.XX.58C | McKinley Bridge |
| PSBC00.4A.59C | I-55/64 @ MP 0.4 (PSB) |
| 025504.2A.62C | I-255 @ MP 4.2 (JB Bridge) |
| 557017.0A.36C | I-55/70 @ MP 17.0 |
| 557017.6A.37C | I-55/70 @ MP 17.6 |
| 557019.1A.38C | I-55/70 @ MP 19.1 |
| 557019.7A.39C | I-55/70 @ MP 19.7 |
| 557022.0A.60C | I-55 @ MP 22.0 |
| XXXXXX.XX.14C | East Hallway |
| XXXXXX.XX.13C | Entrance to TMC |
| 027009.0A.63C | I-270 @ MP 9.0 |
| 027009.0A.64C | I-270 @ MP 9.9 |
| 027009.0A.65C | I-270 @ MP 10.8 |
| 027009.0A.66C | I-270 @ MP 12.0 |
| 027009.0A.67C | I-270 @ MP 12.6 |

| Dynamic Message Signs (DMS) | |
|------------------------------------|---|
| Numerical Location | Textual Location |
| 006410.8W.01S | WB I-64 BETWEEN IL 157 AND IL 159 |
| 557012.3W.02S | WB I-55/70 BETWEEN IL 157 AND IL 162 |
| 027008.4W.03S | WB I-270 JUST WEST OF IL 159 |
| PSBC01.4E.04S | EB I-55/70/64 1 MI EAST OF PSB |
| 005522.0S.05S | SB I-55 JUST SOUTH OF IL 143 |
| 007016.7W.06S | WB I-70 EAST OF I-55 |
| 006404.8W.07S | I-64 WB EAST OF 25TH STREET |
| 557005.3W.08S | WB I-55/70 BEWEEN IL 111 AND IL 203 |
| 007000.9E.09S | EB I-70 JUST EAST OF STAN MUSIAL BRIDGE |

| Video Detectors | |
|---------------------------|---|
| Numerical Location | Textual Location |
| PSBC00.3W.01D | I-55/70/64 AT POPLAR STREET BRIDGE |
| PSBC00.3E.02D | I-55/70/64 AT POPLAR STREET BRIDGE |
| PSBC00.9W.03D | I-55/70/64 AT 13TH AND TUDOR AVENUE RAMP |
| PSBC00.9W.04D | I-55/70/64 AT 13TH AND TUDOR AVENUE RAMP |
| PSBC00.9E.05D | I-55/70/64 AT 13TH AND TUDOR AVENUE RAMP |
| PSBC00.9E.09D | I-55/70/64 AT 13TH AND TUDOR AVENUE RAMP |
| PSBC01.5W.06D | I-55/70/64 JUST EAST OF 13TH AND TUDOR AVE RAMP |

| Side-fire Microwave Radar Detectors | |
|--|-----------------------------------|
| Numerical Location | Textual Location |
| MLKB00.7A.04R | MARTIN LUTHER KING BRIDGE |
| 006403.1A.16R | I-64 AT 10TH STREET |
| 006404.5A.17R | I-64 AT 25TH STREET |
| 006405.6A.18R | I-64 JUST WEST OF IL 111 |
| 006406.3A.19R | I-64 AT MILE POST 6.3 |
| 557003.2A.23R | I-55/70 AT EXCHANGE |
| 557003.8A.24R | I-55/70 at IL 203 |
| PSBC02.4W.25R | I-55/70/64 AT 3RD ST |
| PSBC02.4E.25R | I-55/70/64 AT 3RD ST |
| 557005.2W.26R | I-55/70 AT MILE POST 5.2 |
| 557010.3A.31R | I-55/70 JUST EAST OF I-255 |
| 557012.3A.32R | I-55/70 1 MI N OF IL 157 |
| 557012.7S.33R | I-55/70 AT MILE POST 12.7 |
| 557013.4S.34R | I-55/70 AT MILE POST 13.4 |
| 557013.9S.35R | I-55/70 AT MILE POST 13.9 |
| 557014.6N.36R | I-55/70 AT MILE POST 14.6 |
| 557015.2N.37R | I-55/70 AT MILE POST 15.2 |
| 557015.9N.38R | I-55/70 AT MILE POST 15.9 |
| 557017.0N.39R | I-55/70 AT MILE POST 17.0 (US 40) |
| 557017.6N.40R | I-55/70 AT MILE POST 17.6 |
| 025520.2A.43R | I-64 AT I-255 |
| 025522.0A.44R | I-255 AT MILE POST 22.0 |
| 025523.5A.45R | I-255 AT COLLINSVILLE RD |
| 025524.7A.46R | I-255 AT I-55/70 INTERCHANGE |
| 025525.6A.47R | I-255 AT HORSESHOE LK RD |
| 025526.6A.48R | I-255 AT MILE POST 26.6 |
| 025527.6A.49R | I-255 AT MILE POST 27.6 |
| 025528.4A.50R | I-255 AT MILE POST 28.4 |
| 025529.3A.51R | I-255 AT MILE POST 29.3 |
| 025530.9A.52R | I-255 AT I-270 |
| 027000.5A.62R | I-270 AT MILE POST 0.5 |
| 027001.1A.64R | I-270 AT MILE POST 1.1 |
| 027001.7A.66R | I-270 AT MILE POST 1.7 |
| 027002.4A.67R | I-270 AT IL 3 |
| 027003.2A.69R | I-270 AT ST. THOMAS ROAD |
| 027004.5A.70R | I-270 AT IL 203 |
| 027005.9A.71R | I-270 AT IL 111 |
| 027007.4A.73R | I-270 AT I-255 |
| 027008.4A.74R | I-270 AT MILE POST 8.4 |
| 027004.1A.75R | I-270 WEST OF IL 203 |
| 006408.2A.81R | I-64 AT MILE POST 8.2 |
| 006409.5A.82R | I-64 AT MILE POST 9.5 |
| 006410.8A.84R | I-64 AT MILE POST 10.8 (DMS) |
| MLKB00.3A.91R | MARTIN LUTHER KING BRIDGE |
| 557018.6N.92R | I-55/70 AT MILE POST 18.6 |

| Side-fire Microwave Radar Detectors | |
|--|---------------------------|
| Numerical Location | Textual Location |
| 557019.1S.93R | I-55/70 AT MILE POST 19.1 |
| 005519.7N.94R | I-55 AT MILE POST 19.7 |
| 025504.2A.95R | I-255 AT MILE POST 4.2 |
| 025504.8A.96R | I-255 AT MILE POST 4.8 |
| 025505.8A.97R | I-255 AT MILE POST 5.8 |
| 025507.1A.98R | I-255 AT MILE POST 7.1 |

| Microloop Radar Detectors | |
|----------------------------------|-----------------------------|
| Numerical Location | Textual Location |
| 557009.1A.30D(WB) | I-55/70 AT FAIRMONT LANE |
| 557009.1A.30D(EB) | I-55/70 AT FAIRMONT LANE |
| 557008.0A.29D(WB) | I-55/70 AT MILEPOST 8 |
| 557008.0A.29D(EB) | I-55/70 AT MILEPOST 8 |
| 557007.0A.28D(WB) | I-55/70 JUST EAST OF IL 111 |
| 557007.0A.28D(EB) | I-55/70 JUST EAST OF IL 111 |
| 557005.9A.27D(WB) | I-55/70 JUST WEST OF IL 111 |
| 557005.9A.27D(EB) | I-55/70 JUST WEST OF IL 111 |
| | |

| FIELD EQUIPMENT NUMBERING SYSTEM | |
|---|---|
| EXAMPLE: 006402.8W.11D | |
| 0064 02.8W.11D | Designates highway where field equipment is located |
| 0064 02.8 W.11D | Designates mile marker where field equipment is located |
| 006402.8 W .11D | Designates direction of traffic video detector is monitoring or direction of traffic viewing dynamic message sign |
| 006402.8W. 11 D | Number assigned to field equipment |
| 006402.8W.11 D | D = Video Detector |
| | S = Dynamic Message Sign |
| | R= Microwave Radar Vehicle Detector |
| | C = P/T/Z Surveillance Camera |
| PSBC - Poplar Street Bridge Complex (where Interstates 55/70/64 merge before crossing over Miss. River) | |
| MLKB - Martin Luther King Bridge | |
| IL3 - IL 3 Ramp onto Poplar Street Complex Bridge | |

ITS EQUIPMENT CONTROL TECHNICIAN

This unit shall be eligible for payment only when labor is performed onsite at appropriate work locations. Labor will be measured to the nearest 0.25 hour for each ITS EQUIPMENT CONTROL TECHNICIAN approved for use on the applicable work order. Labor rates for ITS EQUIPMENT CONTROL TECHNICIAN shall be inclusive of but not limited to all regular and premium time, insurance, benefits, overhead, and profit.

The ITS EQUIPMENT CONTROL TECHNICIAN shall furnish all labor, tools, equipment, and other incidentals necessary or convenient to the successful completion of work orders and the carrying out of all duties and obligations imposed by the contract. Also, the ITS EQUIPMENT CONTROL TECHNICIAN shall be required to carry a cellular telephone to facilitate communications with work crews and to verify operation conditions of essential Intelligent Transportations System facilities. The Department reserves the rights to use the cellular telephone to contact the ITS EQUIPMENT CONTROL TECHNICIAN for his or her location and to request a report on the status of a work order. No additional compensation for cellular telephone expenses will be allowed.

This work will be paid for as a part of the contract unit price per HOUR for ITS EQUIPMENT CONTROL TECHNICIAN.

CABINET, MODEL 334

Description. Work under this item shall consist of:

1. the removal, protection, and storage of the existing controller, controller cabinet, and cabinet equipment and
2. furnishing and installing a Model 334 cabinet on the existing controller foundation for the dynamic message sign as shown on the plans and as hereinafter provided.

Materials

General. Cabinet Model 334 shall be an aluminum durable, weatherproof enclosure, with nominal outside dimensions of 66 in (1.7 m) high X 24 in (600 mm) wide X 30 in (762 mm) deep. Cabinet Model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, service panel, thermostatically controlled fan, all necessary mounting hardware and wiring, and other equipment as shown on the plans and specified in these special provisions.

All bolts, nuts, washers, screws, hinges, and hinge pins that are subject to corrosion shall be stainless steel unless otherwise specified. All equipment under this item shall be in accordance with Section 1074.03 of the Standard Specifications, except as modified herein.

Cabinet Components. The housing and the mounting cage assembly shall conform to those of the Model 334 cabinet provisions of the "Traffic Signal Control Equipment Specifications" (TSCES) issued by the State of California's Department of Transportation and to all addenda thereto current at the time of project's advertising. The housing shall be rainproof with the top of

the enclosure crowned to prevent standing water. All exterior seams for the enclosure and doors shall be continuously welded and shall be smooth. The housing shall have no provisions for a police panel or door.

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all 4 sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90° and 180° ±10°. Gasketing shall be provided on all door openings and shall be dust-tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side, level with the bottom edge of the door.

The latching handles on the doors shall have provisions for padlocking in the closed position. When the door is closed and latched, the door shall be locked. The locks and handles shall be on the right side of the front door and the left side of the rear door. The lock and lock support shall be rigidly mounted to the door. The locks shall be Corbin #2, and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

The front and rear doors shall be provided with louvered vents. A removable and reusable air filter shall be housed behind the door vents. The filter filtration area shall cover the vent opening area, and the filter shell provided shall fit over the filter providing mechanical support for the filter. The shell shall be louvered to direct the incoming air downward.

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for housing #1 and 26 cubic feet of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and vented. The fan shall provide a capacity of at least 150 cubic feet of free air delivery per minute of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75°F (24°C) and shut off when the temperature is less than 64°F (18°C). In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125% of the fan motor ampacity.

The housing shall, also, be equipped with a heating element installed in the bottom front of the cabinet and mounted along the side of the rack. The heating element shall draw 500 watts and have an output of at least 1,700 BTU/hr. The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range of 40°F to 100°F and have a built-in thermal cut-off to automatically shut-off the heater in the event of overheating.

All subassemblies shall be mounted in removable 19 in (482 mm) EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of 2 pairs of continuous, adjustable equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at 4 points.

Each cabinet shall be equipped with 2 shelves and one slide out keyboard tray. Shelves shall be the full width of the rack and 12" (300 mm) deep. The shelves shall be designed to support a minimum of 50 pounds.

The cabinet shall be equipped with one rack mounted 96 fiber enclosure equipped with 96 single mode ST ferrules.

Each cabinet shall be equipped with one fluorescent lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall have an F-15-T-8 cool white lamp; operated from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10 in (250 mm) x 15 in (381 mm).

Foundations shall conform to those shown on the plan sheets.

Construction Requirements

The Contractor shall deliver the Cabinet Model 334 mounted on a plyboard-shipping pallet that is bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packaging shell. The housing doors shall be blocked to prevent movement during transportation to the site.

The Contractor shall securely fasten the Cabinet Model 334 on the new concrete foundation at the locations shown on the plans. The Contractor shall confirm the orientation of the Cabinet Model 334 installation and its front door side with the Engineer prior to installation. Stainless steel bolted connections shall be provided with lock-washers, locking nuts, or other approved means to prevent the connection nuts from backing off. Dissimilar materials shall be isolated from one another by stainless steel fittings.

The Contractor shall make all power connections to the cabinet in accordance with the plans and as required. The neutral bus shall be isolated from the cabinet and equipment ground. It shall terminate at the neutral lug ultimately attached to the meter pedestal. All conductors used in cabinet wiring shall terminate with properly sized non-insulated (if used, for DC logic only) or clear insulated spring-spade type terminals, except when soldered to a through-panel solder lug on the rear side of the terminal block or as specified otherwise. All conductors, except those which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor. Cabling shall be routed to prevent conductors from being in contact with metal edges. Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

Cabinet Acceptance Test - In addition to the environmental and design approval tests specified in the FHWA Type 170 Traffic Signal Control System Hardware Specification, the following water spray test shall be performed for each type of cabinet:

Spray water from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. Repeat for each of eight equally spaced positions around the cabinet for a period of five minutes in each position. The water shall be sprayed using a domestic type- sprinkling nozzle at a rate of not less than 10 gal/min per square foot of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

Documentation: Shop drawings and wiring showing the proposed layout of each type of cabinet shall be submitted to the Engineer for approval prior to the start of fabrication. Wiring lists for the internal manufacturer cut sheets for all electrical equipment included in each type of cabinet shall be included in the submission.

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 the complete removal/replacement of the existing DMS on westbound I-70 at milepost 16.8, 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 this special provision 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 the 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, that 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 and able to display at least 3 lines of 18 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, that 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.

Materials

General

The TMDMS shall be a full matrix FULL COLOR LED display (32,000 distinct colors using red, green, and blue LEDs) in a walk-in weatherproof cabinet. The TMDMS shall provide approaching motorists with a clear readable message in all normally encountered weather and lighting conditions. The TMDMS shall be capable of displaying messages with three lines, twenty-one characters per line, at an eighteen-inch character height.

The sign shall be designed for a minimum life of 20 years.

All materials furnished, assembled, fabricated, or installed under this item shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and as detailed in this specification. All details and functionality listed in this specification will be thoroughly inspected and tested by the Department. Failure to meet all details and functionality detailed in this specification shall be grounds for rejection of the equipment.

The equipment design and construction shall utilize the latest available techniques with a minimum number of different parts, subassemblies, circuits, cards, and modules to maximize standardization and commonalty. The equipment shall be designed for ease of maintenance. All component parts shall be readily accessible for inspection and maintenance. Test points shall be provided for checking essential voltages.

The sign shall be designed and constructed so as to present a clean and neat appearance.

All cables shall be securely clamped/tied in the sign housing. No adhesive attachments will be allowed.

The performance of the sign shall not be impaired due to continuous vibration caused by wind, traffic, or other factors. This includes the visibility and legibility of the display.

The TMDMS hardware, along with the sign controller hardware, software, and firmware, shall support all TMDMS functionality described throughout the remaining specification sections.

The TMDMS assembly shall be listed by an accredited 3rd party testing organization for conformance to Underwriters Laboratories (UL) standards 48 (Standard for Electric Signs) and 1433 (Control Centers for Changing Message Signs). Proof of this conformance shall be provided with submittal materials.

Environmental Requirements

The TMDMS shall withstand the following environmental conditions for 24 hours or more with no functional or performance degradation, permanent deformation, or other damages:

Temperature: - 40 to +140°F (-40 to 60°C)
Humidity: 0 to 100 %
Wind: To at least 90 mph with a 30% gust factor
Ice: Front face ice load of 4 pounds per square foot

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

Functional Requirements

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. 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 (with 34mm/35mm pixel pitch), 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.

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 signs 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
- Red

- Yellow
- Fluorescence Pink
- Fluorescence Yellow-Green

Software

The Contractor shall supply three licenses of remote control and sensing software used to control and interrogate the signs. This software shall provide inter-operability with all other signs supplied under this contract and shall be designed to run on a workstation under Windows 10 and Windows Server 2016 either remotely, using the communications link connected to the TMDMS; or locally from a laptop computer connected to the sign controller communications port. The software shall display the message to be downloaded to operators exactly as it will appear on the destination TMDMS and shall provide verification back to the operators that the actual message has been visibly displayed on the destination TMDMS on an individual pixel basis.

The software shall include functionality for message scheduling (based on date and time), message priority queuing, and DMS diagnostics.

The software shall be capable of sending multiple messages to multiple signs based on a user programmable time schedule. Communications shall be by cellular wireless service. The cellular modem and service will be paid for under a separate pay item.

TMDMS control software shall support the creation of user ID's and passwords for up to 25 potential system users. User creation, as well as individual user access rights, shall be assignable only by a system administrator.

Before a system operator can use the TMDMS control software, the software shall request a username and user password. If the correct username and password are not provided, access to the software shall be declined.

An 8-bit identification code shall be assignable to each controller via switches located inside the controller enclosure. The software shall control a network of at least 250 variable message signs.

The software shall have the following functionality:

| | |
|------------------|---|
| Display Control: | <ul style="list-style-type: none"> • View, group, and monitor DMS in real time • Controls any NTCIP-compliant DMS (Any DMS configuration, portable NTCIP message displays) • Powerful list view or map view • Pre-schedule event scenarios • Scheduled status polling of DMS |
| Messaging: | <ul style="list-style-type: none"> • Full suite of message and graphic tools • Message changing depending on time and date • Adjust message duration and priority • Time based scheduled DMS polling |

| | |
|-----------------|---|
| Communications: | <ul style="list-style-type: none"> • 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: | <ul style="list-style-type: none"> • 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 sub-systems • Verify and troubleshoot at the pixel level |
| Security: | <ul style="list-style-type: none"> • 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 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 characters in each of the three lines with spaces between characters, using 5 horizontal X 7 vertical (or larger) pixel matrices.

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

All mandatory NTCIP sign functions shall be available, and message effects shall be visible from the ground-mounted sign control cabinet.

The viewing angle of each discrete LED-formed pixel shall be a minimum cone of 30 degrees around a line normal to the TMDMS viewing surface. The intensity of each pixel shall not decrease more than 30% over the twenty-year life of the sign.

If pulse-width modulation is used for intensity control, the sign drive electronics shall use a refresh or repetition rate of 100 Hz or greater.

The TMDMS walk-in cabinet shall mount three or more light sensors, one, scaled for 100 lux, angled in a northerly direction away from nearby lighting and two normal to the sign face, pointing in opposite directions, scaled for 100,000 lux. Each sensor shall have an adjustable aiming angle. The TMDMS shall be capable of automatic dimming.

Characters Displayed

The sign shall be capable of displaying ASCII characters 32 through 126 and the following characters at any location in the message line:

“A” thru “Z”- All upper case letters.

“0” thru “9”- All decimal digits.

Space (i.e., ASCII code 0x20).

Punctuation marks shown in brackets [. , ! ? - ‘ ’ “ ” / ()]

Special characters shown in brackets [# & * + < >]

3 pixel wide dash

The display modules shall be rectangular and shall have an identical vertical and horizontal pitch between pixels. The pitch shall be no greater than $2\frac{3}{4}$ ”.

The separation between the last column of one display module and the first column of the next shall be equal to the horizontal distance between the columns of a single display module.

The characters shall be legible under all light conditions at a distance of 1100’ within a 30°-degree cone of vision centered around the optical axis of the pixel.

The sign shall be the proper brightness in all lighting conditions for optimum legibility. It shall be bright enough to have a good target value but not to the point where the pixels bloom, especially in low ambient light level conditions.

The brightness and color of each pixel shall be uniform over the entire face of the sign within the fifteen-degree cone of vision from 1100’ to 200’ in all lighting conditions. Non-uniformity of brightness or color over the face of the sign under these conditions shall be cause for rejection of the sign.

Electronic Materials and Components

All electronic components, except printed circuit boards, shall be commercially available, easily accessible, replaceable, and individually removable using conventional electronics repair methods. All electronic assemblies shall meet or exceed IPC 610A workmanship standards.

Each pixel shall have a device attached to the printed circuit board (PCB) to hold and protect the LEDs. These devices shall:

1. Hold the LEDs perpendicular to the display modules within 0.5 degrees,
2. Prevent the LEDs from being crushed or bent during handling,
3. Protect the LEDs from damage when the display module is laid on the front surface (the side that the LED lamps are located),
4. Not put any stress on the LEDs due to differentials of expansion and contraction between the device and the LEDs over the herein specified temperature range,
5. Not become loose or fall off during handling or due to vibrations,
6. Not block airflow over the leads of the LEDs,
7. Securely hold each LED while allowing a gap between the device and a minimum of 95% of the body of each LED for airflow,
8. Not block the light output of the LEDs at the required viewing angle,
9. Be black in color to maximize contrast.

The LEDs shall be protected from the outside environmental conditions including moisture, snow, ice, wind, dust, dirt, and UV rays.

Printed circuit board (PCB) design shall be such that components may be removed and replaced without damage to boards, traces, or tracks.

Only FR-4 0.062 inch minimum thickness material shall be used. Intercomponent wiring shall be copper clad track having a minimum weight of 2 ounces per square foot with adequate cross section for current to be carried. Jumper wires will not be permitted, except from plated-through holes to component. The maximum number of jumper wires allowed per circuit board is two.

All printed circuit boards (PCBs), except for the power supply PCBs, UPS PCBs, modem PCBs and sign controller PCBs, shall be completely conformal coated with a silicone resin conformal coat.

All PCBs shall be finished with a solder mask and a component identifier silk screen.

Capacitors

The DC and AC voltage ratings as well as the dissipation factor of a capacitor shall exceed the worst case design parameters of the circuitry by 50%.

A capacitor which can be damaged by shock or vibration shall be supported mechanically by a clamp or fastener.

Capacitor encasements shall be resistant to cracking, peeling, and discoloration.

Resistors

Any resistor shall not be operated in excess of 50% of its power rating.

Semiconductor Devices

All transistors, integrated circuits, and diodes shall be a standard type listed by EIA and clearly identifiable.

Connectors

All PCB edge connectors and cable connectors, except for those found in the power supply, UPS, modem and sign controller, shall be base plated with nickel and finished with 30 micro-inches of gold.

Mechanical Components

All external screws, nuts, and locking washers shall be stainless steel. No self-tapping external screws shall be used. All parts shall be made of corrosion resistant materials such as plastic, stainless steel, or aluminum. All materials used in construction shall be resistant to fungus growth and moisture deterioration. Dissimilar metals shall be separated by an inert dielectric material.

Main Power Supply and Energy Distribution

The sign and its controller shall be designed for use on the following:

Power line Voltage - 120/240 VAC nominal, single-phase power, 40 amperes per leg. The system shall operate within a voltage range of 95VAC to 135VAC.

Frequency – 60Hz +/- 3Hz

Under normal operation, the drop in voltage between no load and full load of the sign and its controller shall not exceed 10% of the nominal voltage. The system shall be protected by transient suppression devices including MOVs, RIS, and spark gap arrestor.

The system shall report any power failures to the main controller when system power returns.

Power protection shall be provided by a thermal magnetic circuit breaker associated with a 5 mA ground fault circuit interruption (GFI) device. A GFI device shall protect all service outlets.

The sign shall have a 40 A two-pole (common trip) main, 120/240 VAC, single phase, and four wire load center with 20 circuit capability. Each circuit in the sign shall be powered from a separate circuit breaker. The power cables shall be as required by the NEC for acceptable voltage drop to supply AC power to the sign. The power required for sign operation shall not exceed 7000 watts for the sign housing to include fans, heaters, sign controller, communication equipment, and all pixels illuminated at 100% brightness.

Two conduits shall connect the controller cabinet with the walk-in sign display; one for power and one for communications, unless communications between the two is by optical fiber.

The TMDMS manufacturer shall provide two earth ground lugs that are electrically bonded to the TMDMS housing. Lugs shall be installed near the lower left and lower right corners of the TMDMS housing's rear wall. The TMDMS installation contractor shall provide the balance of materials and services needed to properly earth ground the TMDMS to all four ground rods at each site.

The sign shall be equipped with surge suppression circuitry for AC power conductors and external RS-232 data lines to protect them from electrical spikes and transients. The presence of power transients or electromagnetic fields, including those created by any components of the system, shall have no deleterious effect on the performance of the system.

The system shall not conduct or radiate signals which will adversely affect other electrical or electronic equipment including, but not limited to, other control systems, data processing equipment, audio, radio, and industrial equipment.

Surge Protection

The system power shall be protected by two (2) stages of transient voltage suppression devices including MOVs and spark gap arrestor. Tripping of each stage (or both if tripped simultaneously) of the surge protection shall cause the sign controller to report the error condition to the DMS remote monitoring software.

DMS Power Supplies

TMDMS shall be provided with redundant DC power supplies. These shall be rated for a minimum of 50% spare capacity over that required to light every pixel on a line to full intensity and shall automatically pick up the load if one unit fails while sending an error indication to the TMDMS controller. All electrical components operating on more than 24 V shall be UL listed.

The power supplies shall be continuously monitored for proper operation by the sign controller. If the voltage drops below its nominal operating value, an error message shall be generated and transmitted to the DMS client software or laptop computer onsite at local control box location automatically.

Display Modules

Display modules consisting of nominal 18" high characters shall be assembled to form the specified full matrix message configuration. These circuit boards shall be designed and constructed to allow a single service technician to troubleshoot, isolate, remove, and replace these boards with minimal impact to the overall operation of the sign.

All LED boards shall be fully interchangeable and not require any address switches or adjustments when interchanged or placed in service. Module addressing, where required, shall be accomplished in the connector. The DMS manufacturer shall document all LED testing for color so that replacement LED boards shall match existing color.

Pixel status and diagnostics shall include string failure, pixel failure, and failed pixel location (line, module, and row and column numbers). Replacement of a complete display module shall be possible using only simple hand tools. Interconnection of modules shall be through connectors only. All connectors shall be keyed to preclude improper hookups.

The display modules shall be approximately $\frac{3}{4}$ " behind the lens panel assembly.

LED and Pixel Characteristics

Each pixel shall be a maximum of 1-3/8" in diameter. The LEDs in each pixel shall be clustered to maximize long range visibility. The average light intensity of the LEDs in each pixel shall be 3

candelas 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 candelas @ 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. They shall be easily replaceable and individually removable using conventional electronic 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 LEDs manufactured by the Toshiba Corporation, Agilent Technologies (formerly known as Hewlett-Packard), or an approved equivalent. Discrete LEDs shall conform to the following specifications:

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize AllnGAP 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 AllnGAP 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. LEDs with standoffs and surface mount LEDs will not be accepted.
- All LEDs 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.

The state of the LEDs (full on or off) in each pixel of the sign shall be read by the sign controller when it is polled or when a message is downloaded from the DMS client software, existing ATMS software, or laptop computer onsite at local control box location. The state of the LEDs shall allow the DMS client software or the laptop computer onsite at a local control box location to show the actual message that is visibly displayed on the sign in a WYSIWYG format including any full-out or fully stuck on pixels.

All printed circuit boards, except the LED circuit board, shall be conformal coated. The LED board shall be conformal coated, except at the pixels. All printed circuit boards, including the LED circuit board, shall have a solder mask and a component identifier silk screen. The display modules shall be assembled in a full matrix configuration.

LED intensity shall be automatically adjusted to match ambient lighting conditions. This automatic control shall be provided with an override operated through the TMDMS controller communications channel.

Front face panels shall provide a high-contrast background for the TMDMS display matrix. The aluminum portion of each panel shall be painted black and shall contain a circular or square opening for each LED pixel. Openings shall be large enough to not block any portion of the LED-viewing angle.

The front panel shall be heated to prevent fogging and condensation. A minimum eight watt-per-foot, self-regulating, heat tape shall be provided along the bottom of the message area between the glazing and the display modules. The TMDMS controller shall control the heat tape. All heat tape terminal blocks shall be covered for safety.

Structural Requirements

Walk-in TMDMS Display Cabinet

The TMDMS display cabinet shall allow replacement of any display component from the walkway within the sign, excluding the sign display cover. The removal of any display module shall not reduce the structural integrity of the walk-in cabinet.

The maximum weight of the TMDMS display and walk-in enclosure shall not exceed 4000 lb and shall conform to the structural loading capabilities of the sign structure. Dimensions of the TMDMS walk-in enclosure shall not exceed 31' long by 9' high by 3' wide (nominal dimensions).

The walk-in housing dimensions and total weight shall be as shown in this specification or in the plans. The walk-in housing shall protect all internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure Type 3R standards as described in NEMA Standards Publication 2501997, "Enclosures for Electrical Equipment (1000 Volts Maximum)".

The sign housing shall be engineered and P.E. certified to 2001 AASHTO and NCHRP Report 411 specifications for AASHTO basic wind speeds. The sign housing shall also be engineered and P.E. certified to withstand group loading combinations as outlined in 2001 AASHTO, including sign weight, repair personnel and equipment, ice and wind loads, and shall also meet strength requirements for truck-induced gusts as specified in NCHRP Report 412. The sign housing shall be engineered to withstand snow loading (40 PSF) for applicable geographical regions.

The internal structural members shall be extruded aluminum and shall accommodate both display module mounting and air distribution. They shall retain the display modules in a manner to facilitate easy and rapid removal of each display module without disturbing adjacent display modules.

The external fascia panels shall be extruded aluminum and shall be designed to keep heat conduction to a minimum between the exterior surfaces and the interior components. They shall incorporate provisions for retaining and sealing the modular lens panels and have a closed cell

resilient gasket. They shall be finished with a matte black, KYNAR 500 or approved equal, and be removable from within the main sign housing. The external fascia perimeter panels shall be a minimum of 12" wide. The external fascia panels shall be thermally isolated from the rest of the sign housing. There shall be a minimum amount of metal contact between the external fascia panels and the rest of the sign housing.

The lens panel assembly shall be modular in design, interchangeable without misalignment of the lens panel and the LED pixels, and removable from within the main sign housing.

The lens panel aluminum mask shall be 0.040" minimum thickness and panel interiors contain 0.236-inch-polycarbonate sheeting. It shall be perforated to provide an aperture for each pixel on the display modules. Each aperture shall be as small as possible without blocking the LED light output at the required viewing angle.

The lens panel's clear glazing shall be 90% UV opaque, non-breakable, polycarbonate GE LEXAN XL, 1/4" minimum thickness, and clear in color, and it shall be laminated to the inside surface of the lens panel aluminum mask using an acrylic foam tape joining system, 3M Scotch VHB or approved equal, to form the lens panel assembly.

The face shall be finished with a matte black factory applied PVDF resin. All other exterior and interior surfaces shall be a natural aluminum mill finish. No painted surfaces will be allowed.

Inside the sign housing, all 120 VAC service lines shall be independently protected by a thermal magnetic circuit breaker at the housing entry point. All 120 VAC wiring shall be located in conduit, pull boxes, raceways, or control cabinets. No 120 VAC wiring shall be exposed to the inside or outside of the sign housing. The sign housing shall not be considered as a raceway or control cabinet.

The bottom panel of the housing shall have a minimum of four drain holes with replaceable drain filter plug inserts.

A three-point lockable aluminum access door shall be provided at the end of the housing as shown in the plans to enable easy access to the walk-in housing. This access door shall be 6'-8" X 2'-0" minimum. The door shall have a handle-operated locking mechanism, closed cell neoprene gasket, and a stainless-steel hinge. The locking mechanism shall be a heavy-duty, industrial-strength, three-point dead bolt, center-case lock with a zinc finish. There shall be a handle on both the inside and outside of the door. Handles shall be heavy-duty, industrial strength with a zinc finish on the inside handle and a chrome plated finish on the outside handle. The outside handle shall be pad lockable. Included in the door assembly shall be a device to hold the door open at 90 degrees.

For moving and installation purposes, multiple steel lifting eyebolts shall be attached to the top of the TMDMS housing. Eyebolts shall attach directly to the TMDMS housing structural frame and shall be installed at the TMDMS factory. All eyebolt-mounting points shall be sealed to prevent water from entering the TMDMS housing. Lifting eyebolts, as well as the housing frame, shall be designed so that the TMDMS can be shipped and handled without damage or undue stress being applied to the housing prior to or during TMDMS installation on its support structure.

The sign housing shall have a continuous 18-inch-wide walkway extending the full length of the sign. The walkway shall be made of 1/8-inch diamond tread, 6061-T6 or 3003-H22 aluminum. All edges of the walkway grating shall be finished to eliminate sharp edges or protrusions. The

walkway shall be capable of supporting a total load of 1000 lb. within any 10-ft section of the walkway.

The sign housing shall be a minimum of 30 inches wide to allow adequate room inside the sign housing for maintenance personnel. There shall be 18 inches of clear area between all equipment along the entire length of the sign housing from the 18-inch walkway and upwards 6 feet.

The sign shall be designed and constructed so as to present a clean and neat appearance. Poor quality work shall be cause for rejection of the sign. The equipment within the sign housing shall be protected from moisture, dust, dirt, and corrosion. The sign shall be constructed of aluminum alloy 3003-H14, 5052-H32, or an approved equal which shall not be less than 1/8 inch thick. Framing structural members shall be made of aluminum alloy 6061-T6, 6063-T5, or approved equal.

All welding shall be by an inert gas process in accordance with the American Welding Society (AWS) Standards, ANSI/AWS D1.2-97. The LED TMDMS manufacturer's welders and welding procedures shall be certified by an ANSI/AWS certified welding inspector to the 1997 ANSI/AWS D1.2-97 Structural Welding Code for Aluminum.

The sign enclosures shall be capable of withstanding wind loadings of 120 mph without permanent deformation.

The performance of the signs shall not be impaired due to continuous vibration caused by wind, traffic, or other factors. This includes the visibility and legibility of the display.

The ventilation system shall be a positive-pressure, filtered, forced-air system which cools both the display modules and the sign housing interior. The sign housing shall have at least two exhaust ports. Each exhaust port shall be filtered and protected by an aluminum hood assembly.

The ventilation system shall have a minimum of two fans. Air shall be drawn into the sign housing through hoods near the top of the housing and then filtered before reaching the fan units. There shall be one aluminum hood assembly and one inlet filter for each fan.

The filters shall be 1" thick, permanent, reusable filters. These filters shall be easily removable from within the sign housing without the use of tools. Each sign shall include a complete set of replacement filters.

All duct work that impedes access to any sign components shall be easily removable without tools for servicing of these components. Ductwork shall be 0.040" minimum thickness aluminum and shall be designed for minimal pressure drops throughout the system.

Multiple temperature sensors shall activate the ventilation system. There shall be a minimum of one sensor located near the middle of the sign at the top of the display area. There shall be an additional temperature sensor located to accurately measure the ambient temperature outside the sign housing. The temperature sensors shall have an accuracy of +/- 3°F. or better and a range from -40 to +155°F or greater.

The temperatures from the sensors shall be continuously measured and monitored by the sign controller. A temperature reading greater than a user selectable critical temperature shall cause the sign to go to blank, and the TMDMS controller shall report this error message to the central controller.

The ventilation system shall be equipped with a manual override timer to provide ventilation for service personnel. The timer will have a maximum on time of 1 hour.

The LED modules and electronic equipment shall be protected by a fail-safe, back-up fan control system in the event of an electronic fan control failure or shutdown of the sign controller.

The sign housing shall be furnished with a minimum of four florescent lights equipped with cold weather ballasts. The lamps shall be spaced evenly above the walkway and shall be fitted with protective guards. The light switch shall be located near the door and shall include a timer to turn off the lights after a specified time period.

The sign housing shall be equipped with two 15-amp, 120V (+/- 10%) grounded, GFCI protected duplex electrical receptacles to accommodate inspection and maintenance requirements. One of these receptacles shall be located at each end of the sign housing. Additionally, the sign housing shall be equipped with a sufficient and readily available power source in order to accommodate a fiber optic modem and all other necessary communications equipment required to transmit data from the sign to nearest controller cabinet with fiber optic communications for the backbone. The sign housing and display panel shall be designed to minimize any visible internal light from the outside of the DMS when the internal DMS lighting is on during nighttime maintenance activities.

An effective, field-proven defogging and anti-condensation system shall be incorporated into the overall functionality of the sign. The face shall be heated to prevent fogging, frost, and condensation.

A humidity sensor shall be provided and monitored by the sign controller from 0 percent to 100 percent relative humidity in 1 percent or fewer increments. The sensor shall operate and survive from 0 percent to 100 percent relative humidity. The sensor shall have an accuracy that is better than +/- 5 percent relative humidity.

The sign controller shall read the internal temperature sensors, external ambient temperature sensor, and the humidity sensor. The sign controller shall use these readings in an algorithm that turns on the heater and/or the fans at the appropriate times to reduce both frost on the face of the sign and condensation on the display modules and other electronic circuitry.

Baseboard heaters shall be included in the sign housing. These heaters shall be capable of remote start up in anticipation of winter field service.

The interior of the sign shall include a fold-down shelf for a laptop computer.

Sign Controller

The sign controller shall include a minimum of two (2) serial communications I/O ports; one (1) RS-232, one (1) RS-485, and one (1) Ethernet port.

The sign controller shall be programmed to receive NTCIP-compliant sign control commands from the central controller (DMS client software) or laptop computer, transmit NTCIP-compliant responses as requested to the central controller (DMS client software or existing ATMS) or laptop computer, monitor sign and message status, and control sign operation and message displays.

The controller will have power-up and auto-restart capabilities with a programmable default message (including a blank message) when recovering from a power off condition.

The sign controller shall be programmed to receive sign control commands from the master controller, transmit responses as requested to the master controller, and control sign operation and message displays.

The sign controller shall be able to receive and send messages and data via IEEE 802.3 (Ethernet), fiber optic modem, and cellular CDPD, CDMA or GSM/GPRS. Transmission speed shall be a minimum of 9.6 kbps. A test pattern shall be provided in the DMS controller.

The sign controller shall be designed for fail-safe prevention of improper information display in the case of a system malfunction. Failure of any sign shall not affect operation of any other sign in the system. The sign controller shall consist, but not be limited to, the following.

Local control panel status indicators including:

1. Power on/off
2. Communication status with the electronics in the walk-in housing
3. Sign display power supply status
4. Controller address
5. Power supply module
6. Central processor module
7. Input/output circuits

The sign controller shall have power-up and auto-restart capabilities with automatic sign blanking when recovering from a power-off condition. A watch-dog circuit shall be utilized to provide automatic shutdown of the sign in the event of power or sign controller failure.

Connections from the controller shall be accomplished via industry standard, keyed type connectors with a retaining mechanism.

The sign controller shall communicate with the display modules via the system interface circuit consisting of data bus drivers and line address decoders. Communication and control lines between the sign controller and the system interface circuits shall be surge protected.

The sign controller shall be controlled from the DMS client software, existing ATMS software, or the laptop computer which shall specify the appropriate display. The sign controller and its software shall perform the following functions:

1. Display a message, including:
 2. Static messages
 3. Flashing messages
 4. Alternating messages
 5. Double brush stroke messages for maximum legibility
 6. Full-Matrix type displays

It shall be possible to separately vary the flashing and alternating frequency. The flashing frequency and alternating frequency both shall vary between one-half and five seconds in one tenth second increments.

It shall be possible to flash any character or set of characters in a static or alternating message. In the case of alternating message, the flashing period shall be a submultiple of the alternating on time it is associated with.

The sign controller shall report errors and failures including, but not limited to:

- Data transmission error
- Receipt of invalid data
- Communications failure recovery
- AC power failure
- Power recovery
- Pixel status
- Fan status
- Temperature status
- Power supply status

The sign controller shall issue an SNMP trap under the following conditions:

- Power Supply Failure – when the AC power supply at a DMS has failed.
- Power Restoration - whenever it detects restoration of AC power at the sign controller.
- Temperature Limit – Whenever internal DMS temperature initially exceeds a programmed safety limit. A new trap will not be issued until the temperature once again falls below the safety limit and then exceeds it.
- Door Open – Whenever the door of the DMS housing or the door of the controller cabinet is opened.

Message and status monitoring:

The sign controller shall transmit a return message to the DMS client software and existing ATMS software whenever it receives a valid request for status. The return message shall contain the following:

- Address of the sign controller
- Actual message that is visibly displayed on the sign on an individual pixel basis
- Current sign illumination level
- Error and failure reports
- Temperature readings
- Power supply operational status
- Origin of display message transmission (laptop, manual, central, etc)
- Beacon status (for possible future enhancement)
- Uninterruptible power supply status

The sign controller shall blank any message displayed in the event of power or sign controller failure.

The sign shall normally display single stroke (5 X 7) characters, compressed (4 X 7), expanded (6 X 7), or double-stroke (7 X 7) character fonts. Each font shall be fully customizable, and modifications to a font may be downloaded to the sign controller from the DMS client software, existing ATMS software, or laptop computer at any time without any software or hardware modifications. The sign shall be capable of displaying a different font and character spacing on each line.

The sign controller shall monitor the photocell circuits in the sign and convert the measured light intensity into the desired pixel brightness. The photo circuit readings shall be correlated with a brightness table in the sign controller. The brightness table shall have a minimum of 255 brightness levels. Automatic adjustment of the LED driving waveform duty cycle shall occur in small enough increments so that brightness of the sign changes smoothly with no perceivable brightness change between adjacent levels. The brightness levels shall be adjustable from the DMS client software.

The operational status of each pixel in the sign shall be automatically tested once a day and tested when a pixel test is requested from the DMS client software, existing ATMS software, or laptop computer. A list of defective pixels shall then be transmitted to the DMS client software, existing ATMS software, or laptop computer and logged into the log file, listing pixel status, module number, column number, and pixel number. This pixel status test shall distinguish the difference between full out and fully stuck on pixels. This test shall not affect the displayed message for more than 0.5 seconds.

When the sign controller is polled and when a message is downloaded from the DMS client software, existing ATMS software, or laptop computer, each pixel and its current state for the current displayed message in the sign shall be read and shall be returned to the DMS client software and existing ATMS software to show either on a laptop computer or the controller itself the actual message that is visibly displayed on the sign on an individual pixel basis in a WYSIWYG format.

The operational status of the fans shall have the ability to be automatically tested once a day and tested on command from the DMS client software, existing ATMS software, or laptop computer. Any failure shall cause an error message to be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer.

Temperature sensors shall be continuously measured and monitored by the sign controller. A temperature greater than a user selectable critical temperature shall cause the sign message to go to blank, and an error message shall be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer. This user selectable critical temperature shall be capable of being changed by the DMS client software, existing ATMS software (if available), or laptop computer. The DMS client software, existing ATMS software (if available), and laptop computers shall have the ability to read all temperature measurements from the sign controller. When the sign reaches an internal temperature of 130° F, it shall cut the LED intensity to half of its normal brightness to keep the sign from reaching the critical temperature and shutting down.

When the display time of a message has expired, the controller shall set the sign to neutral. A sign is considered to be neutral when the sign is blank.

In the event of a communications failure with the DMS client software or existing ATMS software, the sign controller shall set the sign to neutral after a user-defined number of minutes (1 to 60), unless communications have been restored within this period. This function shall apply only when the sign controller is in the master control mode.

All LED module power supplies shall be continuously monitored by the sign controller. A low voltage reading shall cause an error message to be sent to the DMS client software, existing

ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer.

There shall be no perceivable flicker or ghosting of the pixels during sign erasure and writing periods.

Message additions, deletions, and changes in the sign controller shall be made from either the DMS client software, existing ATMS software, or the laptop computer.

In the event of an AC power loss, all non-volatile memory shall be retained for a minimum of 30 days. AC power failure shall cause the sign controller to notify the DMS client software and existing ATMS software and display an error message on the DMS client software and existing ATMS software CRT. For cellular operation, the sign controller shall immediately access the modem to notify the DMS client software and existing ATMS of the AC power failure.

Failure of any sign shall not affect the operation of any other sign in the system.

The sign controller internal time clock shall ensure that a message is taken down at the correct time, even in the event of communications loss.

The sign controller shall maintain its internal clock during power outages of less than 4 hours and display the proper message when power is restored.

The sign controller shall be able to put a self-updating time, temperature, and/or date display on the sign.

Flashing Beacons

The TMDMS shall be equipped with two 12" diameter yellow flashing beacons that can be programmed to operate through the sign controller and remote access software. The beacons shall be located at the top of the sign on each end and shall flash alternately. The beacons shall be equipped with tunnel visors to maximize visibility.

Construction Requirements

Sign construction and installation shall be coordinated with the Engineer. TMDMS shall be transported and erected in a manner, recommended by the manufacturer, providing a minimum clearance of 17.5 ft. above the pavement and a horizontal appearance to motorists once fully installed as shown on the plans.

Technical Assistance

The DMS manufacturer's technical representative shall provide on-site technical assistance in following areas:

1. Sign to structure installation
2. Controller cabinet installation
3. Sign housing to ground control cabinet cable termination
4. Initial sign turn on and stand alone test

The initial powering up of the sign(s) shall not be executed without the permission of the DMS manufacturer's technical representative.

Any special or proprietary cables shall be provided by the DMS manufacturer to the installation contractor.

Testing

The Contractor shall certify in writing to the Engineer that each TMDMS installation is fully compliant with the NTCIP standards named in the materials section of this special provision. All mandatory objects and the optional objects mentioned above under materials shall be certified for each sign and provided to the Department. In addition, following installation, the Contractor shall perform a site test of each sign, demonstrating the functionality and performance required in the materials section of this special provision to the Engineer. The Contractor shall give the Engineer a minimum of two weeks' notice before performing the site test.

Testing Requirements

The Department has the right to require performance testing of materials and equipment not previously tested and approved. If technical data is not considered adequate for approval, samples may be requested for testing.

The DMS manufacturer shall provide five (5) copies of all factory acceptance tests, stand-alone, system test, and 90 day test procedures and data forms for the Department's approval at least 60 calendar days prior to the day the tests are to begin. The test procedures shall include the sequence in which the tests will be conducted. The test procedures shall have the Department's approval prior to submission of equipment for tests.

The DMS manufacturer shall perform the factory acceptance tests, stand-alone, and system test. The DMS manufacturer shall furnish data forms containing all the data taken, as well as quantitative results for all tests. The data forms shall be signed by an authorized representative (company official) of the equipment manufacturer. At least one (1) copy of the data forms shall be sent to the Department within 14 days of the test's conclusion.

The Department reserves the right to have a representative to witness all tests. The results of each test shall be compared with the requirements specified herein. Failure to conform to the requirements of any test shall be counted as a defect, and the equipment shall be subject to rejection by the Department. Rejected equipment may be offered again for a retest, provided that all non-compliances have been corrected and retested by the DMS manufacturer and evidence thereof submitted to the Department.

Each of the tests on all or one type of equipment must be completed within five (5) working days of each other. Any delays in performing all these tests may result in the DMS manufacturer paying the additional costs of providing the Department's representatives for the additional testing time.

Final inspection and acceptance of equipment shall be made after installation at the designated location as shown on the installation plans.

The DMS manufacturer shall be responsible for providing the test fixtures and test instruments for all the tests.

The Stand-Alone and System Tests are separate tests. However, they may be performed by the DMS manufacturer during the same visit.

Consequences of Test Failures: If any unit fails to pass its test, the unit shall be corrected or another unit substituted in its place, and the test shall be successfully repeated.

If a unit has been modified as a result of a test failure, a report shall be prepared and delivered to the Department prior to shipment of the unit. The report shall describe the nature of the failure and the corrective action taken.

If a failure pattern develops, the Department may direct that design and construction modifications be made to all units at no additional cost or extension of the contract period.

Factory Acceptance Tests

The TMDMS manufacturer shall be responsible for conducting demonstration tests on all units at a TMDMS's manufacturer's facility. These tests shall be performed on each unit supplied. The Department shall be notified a minimum of 30 calendar days before the start of tests. At a minimum, all equipment shall have passed the following individual tests:

- Examination of Product: Each TMDMS unit shall be examined carefully to verify that the materials, design, construction, markings, and quality of work comply with the requirements of these project specifications.
- Continuity Tests: The wiring shall be checked to determine conformance with the requirements of the appropriate paragraphs in these project specifications.
- Operational Test: Each TMDMS unit shall be operated long enough to permit equipment temperature stabilization and to check and record an adequate number of performance characteristics to ensure compliance with the requirements of these project specifications.
- NTCIP Test: A NTCIP test shall be performed at the TMDMS manufacturer's facility. The Department may elect to perform and/or witness this test. The specifics of this factory acceptance test shall be proposed by the TMDMS manufacturer to the Department for approval.
- Stand-Alone Tests: The TMDMS manufacturer shall conduct an approved stand-alone test of the equipment installation at the field site. The test shall, as a minimum, exercise all stand-alone (non-network) functional operations of the field equipment with all of the equipment installed as per the contract documents.

Approved data forms shall be completed and turned over to the Department as the basis for review and rejection or acceptance. At least 30 working days notice shall be given prior to all tests to permit the Department to observe each test.

System Tests

After the installation of the TMDMS system is completed and the successful completion of the System Test, the TMDMS system shall be subjected to one continuous 72-hour full operating test prior to a 90-day test period. The test shall consist primarily of exercising all control, monitor, and communications functions of the field equipment by the central management software.

The 90 days test period shall commence on the first day after the successful completion of the approved 72-hour continuous full operating test period.

During the 90 days test period, downtime due to mechanical, electrical, and/or other malfunctions shall not exceed five (5) working days. The Engineer may extend the 90 days test period by a number of days equal to the downtime in excess of five (5) working days.

The Engineer will furnish the TMDMS vendor with a letter of approval stating the first day of the 90 days test period.

Maintenance Services

The installation contractor shall provide complete maintenance services for the entire TMDMS assembly until the final acceptance. All labor, travel, replacement parts, and associated costs necessary to maintain the TMDMS assembly shall be included in the contract at no additional cost to the Department.

The installation contractor shall correct all failures in the TMDMS assembly within 48 hours of notification from the Department until final acceptance. A failure of a sign installation shall be defined as the inability of the sign to function as per these specifications. A failure shall also be defined as the sign becoming unreadable or illegible as determined by the Department.

Final System Acceptance

Final system acceptance will be defined as when all work and materials provided have been furnished and completely installed by the TMDMS manufacturer, all parts of the work have been approved and accepted by the Department, and the TMDMS has been operated continuously and successfully for 90 calendar days with no more than 5 calendar days downtime due to mechanical, electrical, and/or other malfunctions as specified herein.

The warranty period, as specified in herein, will begin upon final acceptance.

Operator's Manuals

A manual containing a general description and detailed operating and installation instructions shall be provided for each different type or model of equipment. One (1) copy of the manual shall be provided and kept in the sign cabinet. An additional ten (10) copies of the manual shall be submitted to the Department for each model of equipment. An additional copy of the manual shall be submitted to the Department on CD for each model of equipment. The manual shall include the following information:

1. A general description of the equipment, including all information necessary to describe the basic use or function of the system components. This shall include a general block diagram presentation of the equipment. Where auxiliary equipment is required, tabular charts shall be included listing such equipment. These charts shall include the nomenclature of the physical and electrical characteristics and functions of the auxiliary equipment, unless such information is contained elsewhere in an associated manual. In the latter case, a reference shall be made to the location of the information pertaining to the auxiliary equipment.
2. The theory of operation of the system components in a clear, concise manner supported by simplified schematics, logic, data flow diagrams, one-function diagrams, etc. Timing and waveform diagrams and voltage levels shall be shown as required. A logical

development shall be used starting with a system block level and proceeding to a circuit analysis. Circuit analysis shall be detailed whenever circuits are not normally found in standard textbooks. The application of new theoretical concepts shall be fully described. Where the design allows operation in a number of different modes, an operational description of each mode shall be included.

3. In simple, clear language, the routine of operation from necessary preparations for placing the equipment into operation to securing the equipment after operation. This section shall contain appropriate illustrations with the sequence of operations presented in tabular form wherever feasible. This section shall also contain a list of applicable test instruments, aids, and tools required in the performance of necessary measurements and technique of each system component. In addition, set-up test and calibration procedures shall be described.
4. Schematic diagrams shall be complete and accurate as required to supplement the text material and to allow the books to be a self-contained technical information source. Maximum size of these diagrams should be limited to allow their use in close proximity of the equipment, in the classroom, etc. Part reference symbols, test voltages, waveforms, and other aids to understanding of the circuit's function shall be included on the diagrams. Test voltages, waveforms, and other aids to understanding of the circuit's function may be shown on both the simplified schematics and other drawings (as required in the above sections) on theory of operation, maintenance, or on the schematic diagrams required for this section. The overall scope of information shall not be less, however, than that stated for the schematic diagrams.

Software Manuals

The TMDMS manufacturer shall provide manuals and data for the computer software system and components thereof. One (1) copy of the manual shall be provided and kept in the sign cabinet. Ten (10) additional copies of the manual shall be submitted to the Department for each version of software. One (1) copy of the manual shall be provided on CD. As software is upgraded, updated versions of the manual shall be provided. This submittal shall include the following:

1. Software user's manuals shall be supplied including instructions for performing a backup of all software and message libraries.
2. Two (2) copies of source programs, for master and sign controller software, shall be provided on CD-ROM. The Department shall have the right to duplicate the sign controller software as needed for use in controlling signs under its' jurisdiction.
3. The TMDMS manufacturer's NTCIP MIB (Management Information Base) shall be provided to the Department.
4. Warranty information.
5. Preventive maintenance and maintenance information.

Maintenance Manuals

A manual containing a general description and detailed maintenance instructions shall be provided for each different type or model of equipment. One (1) copy of the manual shall be provided and kept in the sign cabinet. An additional ten (10) copies of the manual shall be submitted to the Department for each model of equipment. One (1) copy of the manual shall be provided on CD. The manual shall include the following information:

1. The manufacturer's recommended procedures and checks necessary for preventive maintenance. This shall be specified for pre-operation, weekly, monthly, quarterly, semi-annual, annual, and "as required" checks necessary to assure reliable equipment operation. Specifications, including tolerances, for all electrical, mechanical, and other applicable measurements and/or adjustments shall be listed. The TMDMS manufacturer shall provide the Department with a sample preventive maintenance schedule.
2. Data necessary for isolation and repair of failures or malfunctions, assuming the maintenance technicians to be capable of analytical reasoning using the information provided above. Accuracies, limits, and tolerances for all electrical, physical, or other applicable measurements shall be described. General instructions shall be included for disassembly, overhaul, and reassembly including shop specifications or performance requirements.
3. Detailed instructions shall be given only where failure to follow special procedures would result in damage to the equipment, improper operation, or danger to operating or maintenance personnel.
4. The parts list shall contain all information required to describe the characteristics of the individual parts, as required for identification. It shall include a list of all equipment within a group and list of all assemblies, subassemblies, and replacement parts of units. The tabular arrangement shall be in alphanumeric order of the schematic reference symbols and shall give the associated description, manufacturer's name, and part number. A table of contents or some other convenient means, e.g., appropriate grouping, shall be provided for the purpose of identifying major components, assemblies, etc.

As-Built Documentation

The TMDMS manufacturer shall provide to the Department the following documentation of the complete installed equipment prior to final payment. Sufficient documentation shall be provided to reflect "as-built" conditions and to facilitate operation, maintenance, modification, and expansion of the system or any of its individual components. Manufacturer supplied documentation which covers the intent of this requirement may be used, subject to the approval of the Department:

The TMDMS Manufacturer shall prepare and submit the following detailed drawings for each sign:

- TMDMS character set as detailed herein,
- All non-catalog or custom-made components,
- Sign housing assembly details, including the component location details and a layout of all the display elements, complete with dimensions,
- Sign housing structural details, including member details, support mechanism details required for installation of the TMDMS onto the sign truss, welding details, and miscellaneous hardware details; complete with dimensions and sizes,
- Sign mounting bracket structural details, including miscellaneous members and hardware required to attach the TMDMS to the sign truss, complete with dimensions and sizes, and
- Wiring schematics.

Final documentation shall reflect all field changes and software modifications and shall be provided before final payment is made.

The TMDMS manufacturer shall coordinate and take the lead on this effort with the installation contractor.

This documentation shall include drawings of conduit layouts, cable diagrams, wiring lists, cabinet layouts, wiring diagrams, and schematics for all elements of the communications system. This shall also include detailed drawings identifying by cable type, color code and function, and the routing of all conductors (pairs) in the communications system.

Four (4) copies of each as-built installation shall be delivered to the Department with one complete copy to be placed in the equipment cabinet at each TMDMS location. Drawings left in the TMDMS shall be attached to the door with stainless steel fasteners and protected from weather with a waterproof enclosure.

Warranty

The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. Any parts or equipment found to be defective and/or determined to be a failure in design, materials, and workmanship during the warranty period shall be replaced free of charge. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt, and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. Company contact information and warranty dates should be clearly shown on the warranty certificate. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Method of Measurement

Truss mounted changeable message sign shall be measured for payment as each per TMDMS complete, in place, tested to assure all functionality and performance required above, and accepted by the Engineer.

Basis of Payment

Payment will be made at the contract unit price per EACH for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN, which shall include:

1. the removal and disposal of the existing TMDMS and the existing hardware. The removed DMS and hardware will become the property of the Contractor upon completion of the contract. (Salvage value shall be reflected in the bid price.) and
2. all equipment, material, documentation, testing, and labor detailed in the contract documents for this new TMDMS and associated hardware for this bid item.

SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT

The Contractor shall install the ITS components at the locations indicated on the plans.

All ITS components shall be subject to a 30-day burn-in period. During the "burn-in" period, all components shall perform continuously, without any interruption of operation, for a period of thirty days. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

The Department will program the ITS components and integrate them into the existing ITS system.

The Contractor shall be responsible for installing the proposed ITS components in accordance with the plans, specifications, and manufacturers recommended practices.

This work will not be paid for separately but shall be included in the contract bid price for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN.

STATUS OF UTILITIES TO BE ADJUSTED

NO UTILITIES TO BE ADJUSTED

The above represents the best information of the Department and is only included for the convenience of the bidder. The applicable provisions of Sections 102 and 103 and Articles 105.07 and 107.20 of the Standard Specifications for Road and Bridge Construction shall apply.

If any utility adjustment or removal has not been completed when required by the Contractor's operation, the Contractor should notify the Engineer in writing. A request for an extension of time will be considered to the extent the Contractor's operations were affected.

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

Revised: November 1, 2014

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment’s respective horsepower range shall be retrofitted:

| Effective Dates | Horsepower Range | Model Year |
|----------------------------|------------------|------------|
| June 1, 2010 ^{1/} | 600-749 | 2002 |
| | 750 and up | 2006 |
| June 1, 2011 ^{2/} | 100-299 | 2003 |
| | 300-599 | 2001 |
| | 600-749 | 2002 |
| | 750 and up | 2006 |
| June 1, 2012 ^{2/} | 50-99 | 2004 |
| | 100-299 | 2003 |
| | 300-599 | 2001 |
| | 600-749 | 2002 |
| | 750 and up | 2006 |

- 1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.
- 2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<http://www.epa.gov/cleandiesel/verification/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: March 2, 2019

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform **0.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents enough DBE participation has been obtained to meet the goal or,
- (b) The bidder documents a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at: <http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement and failure of the bidder to comply will render the bid not responsive.

The bidder shall submit a DBE Utilization Plan (form SBE 2026), and a DBE Participation Statement (form SBE 2025) for each DBE company proposed for the performance of work to achieve the contract goal, with the bid. If the Utilization Plan indicates the contract goal will not be met, documentation of good faith efforts shall also be submitted. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract. The required forms and documentation must be submitted as a single .pdf file using the "Integrated Contractor Exchange (iCX)" application within the Department's "EBids System".

The Department will not accept a Utilization Plan if it does not meet the bidding procedures set forth herein and the bid will be declared not responsive. In the event the bid is declared not responsive, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty and may deny authorization to bid the project if re-advertised for bids.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan is approved. All information submitted by the bidder must be complete, accurate and adequately document enough DBE participation has been obtained or document the good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful

DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. This means the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts the bidder has made. Mere *pro forma* efforts, in other words efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases and will be considered by the Department.
- (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.
 - (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
 - (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve

the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
 - (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
 - (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
 - (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- (b) If the Department determines the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided it is otherwise eligible for award. If the Department determines the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification will also include a statement of reasons for the adverse determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period to cure the deficiency.
- (c) The bidder may request administrative reconsideration of an adverse determination by emailing the Department at "DOT.DBE.UP@illinois.gov" within the five calendar days after the receipt of the notification of the determination. The determination shall become final if a request is not made on or before the fifth calendar day. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be reviewed by the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by

the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

- (a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.
- (b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.
- (c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.
- (d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:
 - (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 - (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.
- (e) DBE as a material supplier:
 - (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
 - (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.

- (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be emailed to the Department at DOT.DBE.UP@illinois.gov.
- (b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, a new Request for Approval of Subcontractor will not be required. However, the Contractor must document efforts to assure the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.
- (c) SUBCONTRACT. The Contractor must provide copies of DBE subcontracts to the Department upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.
- (d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:
- (1) The replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or

- (2) The DBE is aware its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
 - (3) The DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.
- (e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;
- (3) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.
- (6) The Contractor has determined the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides written notice to the Contractor of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

- (f) FINAL PAYMENT. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than 30 calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

- (h) **RECONSIDERATION**. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of “Good Faith Effort Procedures” of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

ILLINOIS WORKS APPRENTICESHIP INITIATIVE – STATE FUNDED CONTRACTS (BDE)

Effective: June 2, 2021

Revised: September 2, 2021

Illinois Works Jobs Program Act (30 ILCS 559/20-1 et seq.). For contracts having an awarded contract value of \$500,000 or more, the Contractor shall comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules. The goal of the Illinois Apprenticeship Works Initiative is that apprentices will perform either 10% of the total labor hours actually worked in each prevailing wage classification or 10% of the estimated labor hours in each prevailing wage classification, whichever is less. The Contractor may seek from the Department of Commerce and Economic Opportunity (DCEO) a waiver or reduction of this goal in certain circumstances pursuant to 30 ILCS 559/20-20(b). The Contractor shall ensure compliance during the term of the contract and will be required to report on and certify its compliance. An apprentice use plan, apprentice hours, and a compliance certification shall be submitted to the Engineer on forms provided by the Department and/or DCEO.

SPEED DISPLAY TRAILER (BDE)

Effective: April 2, 2014

Revised: January 1, 2022

Revise the last paragraph of Article 701.11 of the Standard Specifications to read:

“When not being utilized to inform and direct traffic, sign trailers, speed display trailers, arrow boards, and portable changeable message boards shall be treated as nonoperating equipment.”

Add the following to Article 701.15 of the Standard Specifications:

“(m) Speed Display Trailer. A speed display trailer is used to enhance safety of the traveling public and workers in work zones by alerting drivers of their speed, thus deterring them from driving above the posted work zone speed limit.”

Add the following to Article 701.20 of the Standard Specifications:

“(k) When speed display trailers are shown on the Standard, this work will not be paid for separately but shall be considered as included in the cost of the Standard.

For all other speed display trailers, this work will be paid for at the contract unit price per calendar month or fraction thereof for each trailer as SPEED DISPLAY TRAILER.”

Add the following to Article 1106.02 of the Standard Specifications:

“(o) Speed Display Trailer. The speed display trailer shall consist of a LED speed indicator display with self-contained, one-direction radar mounted on an orange see-through trailer. The height of the display and radar shall be such that it will function and be visible when located behind concrete barrier.

The speed measurement shall be by radar and provide a minimum detection distance of 1000 ft (300 m). The radar shall have an accuracy of ± 1 mile per hour.

The speed indicator display shall face approaching traffic and shall have a sign legend of “YOUR SPEED” immediately above or below the speed display. The sign letters shall be between 5 and 8 in. (125 and 200 mm) in height. The digital speed display shall show two digits (00 to 99) in mph. The color of the changeable message legend shall be a yellow legend on a black background. The minimum height of the numerals shall be 18 in. (450 mm), and the nominal legibility distance shall be at least 750 ft (250 m).

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the work zone posted speed limit is exceeded. The speed indicator shall have a maximum speed cutoff. On roadway facilities with a normal posted speed limit greater than or equal to 45 mph, the detected speeds of vehicles traveling more than 25 mph over the work zone speed limit shall not be displayed. On facilities with normal posted speed limit of less than 45 mph, the detected speeds of vehicles traveling more than 15 mph over the work zone speeds limit shall not be displayed. On any roadway facility if detected speeds are less than 25 mph, they shall not be displayed. The display shall include automatic dimming for nighttime operation.

The speed indicator measurement and display functions shall be equipped with the power supply capable of providing 24 hours of uninterrupted service.”

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.
The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017
Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

| Value of Subcontract Reported on Form BC 260A | Mobilization Percentage |
|---|-------------------------|
| Less than \$10,000 | 25% |
| \$10,000 to less than \$20,000 | 20% |
| \$20,000 to less than \$40,000 | 18% |
| \$40,000 to less than \$60,000 | 16% |
| \$60,000 to less than \$80,000 | 14% |
| \$80,000 to less than \$100,000 | 12% |
| \$100,000 to less than \$250,000 | 10% |
| \$250,000 to less than \$500,000 | 9% |
| \$500,000 to \$750,000 | 8% |
| Over \$750,000 | 7%” |

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021

Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

- “3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx>. Payrolls shall be submitted in the format prescribed by the IDOL.”

TRAFFIC SPOTTERS (BDE)

Effective: January 1, 2019

Revise Article 701.13 of the Standard Specifications to read:

“701.13 Flaggers and Spotters. Flaggers shall be certified by an agency approved by the Department. While on the job site, each flagger shall have in his/her possession a current driver’s license and a current flagger certification I.D. card. For non-drivers, the Illinois Identification Card issued by the Secretary of State will meet the requirement for a current driver’s license. This certification requirement may be waived by the Engineer for emergency situations that arise due to actions beyond the Contractor’s control where flagging is needed to maintain safe traffic control on a temporary basis. Spotters are defined as certified flaggers that provide support to workers by monitoring traffic.

Flaggers and spotters shall be stationed to the satisfaction of the Engineer and be equipped with a fluorescent orange, fluorescent yellow/green, or a combination of fluorescent orange and fluorescent yellow/green vest meeting the requirements of ANSI/ISEA 107-2004 or ANSI/ISEA 107-2010 for Conspicuity Class 2 garments. Flaggers shall be equipped with a stop/slow traffic control sign. Spotters shall be equipped with a loud warning device. The warning sound shall be identifiable by workers so they can take evasive action when necessary. Other types of garments may be substituted for the vest as long as the garments have a manufacturer’s tag identifying them as meeting the ANSI Class 2 requirement. The longitudinal placement of the flagger may be increased up to 100 ft (30 m) from that shown on the plans to improve the visibility of the flagger. Flaggers shall not encroach on the open lane of traffic unless traffic has been stopped. Spotters shall not encroach on the open lane of traffic, nor interact with or control the flow of traffic.

For nighttime flagging, flaggers shall be illuminated by an overhead light source providing a minimum vertical illuminance of 10 fc (108 lux) measured 1 ft (300 mm) out from the flagger’s chest. The bottom of any luminaire shall be a minimum of 10 ft (3 m) above the pavement. Luminaire(s) shall be shielded to minimize glare to approaching traffic and trespass light to adjoining properties. Nighttime flaggers shall be equipped with fluorescent orange or fluorescent orange and fluorescent yellow/green apparel meeting the requirements of ANSI/ISEA 107-2004 or ANSI/ISEA 107-2010 for Conspicuity Class 3 garments.

Flaggers and spotters shall be provided per the traffic control plan and as follows.

- (a) Two-Lane Highways. Two flaggers will be required for each separate operation where two-way traffic is maintained over one lane of pavement. Work operations controlled by flaggers shall be no more than 1 mile (1600 m) in length. Flaggers shall be in sight of each other or in direct communication at all times. Direct communication shall be obtained by using portable two-way radios or walkie-talkies.

The Engineer will determine when a side road or entrance shall be closed to traffic. A flagger will be required at each side road or entrance remaining open to traffic within the operation where two-way traffic is maintained on one lane of pavement. The flagger shall be positioned as shown on the plans or as directed by the Engineer.

- (b) Multi-Lane Highways. At all times where traffic is restricted to less than the normal number of lanes on a multilane pavement with a posted speed limit greater than 40 mph and the workers are present, but not separated from the traffic by physical barriers, a flagger or

spotter shall be furnished as shown on the plans. Flaggers shall warn and direct traffic. Spotters shall monitor traffic conditions and warn workers of errant approaching vehicles or other hazardous conditions as they occur. One flagger will be required for each separate activity of an operation that requires frequent encroachment in a lane open to traffic. One spotter will be required for each separate activity with workers near the edge of the open lane or with their backs facing traffic.

Flaggers will not be required when no work is being performed, unless there is a lane closure on two-lane, two-way pavement.”

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: November 1, 2021

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form “SBE 723” within ten business days following the reporting period. The reporting period shall be Sunday through Saturday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Add the following to Article 701.03 of the Standard Specifications:

“(q) Temporary Sign Supports1106.02”

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

“For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer’s specifications.”

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

“701.15 Traffic Control Devices. For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer’s self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device.”

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

“1106.02 Devices. Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 1 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 2 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH-16 compliant is available, an NCHRP 350 or MASH-2009 compliant device may be used, even if manufactured after December 31, 2019.”

Revise Articles 1106.02(g), 1106.02(k), and 1106.02(l) to read:

“(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

- (k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department's qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

- (l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department's qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis."

REVISIONS TO THE ILLINOIS PREVAILING WAGE RATES

The Prevailing rates of wages are included in the Contract proposals which are subject to Check Sheet #5 of the Supplemental Specifications and Recurring Special Provisions. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and Check Sheet #5 of the Contract, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at <http://www.state.il.us/agency/idol/> or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.