

BID FORM

**MISSOURI DEPARTMENT OF TRANSPORTATION****GENERAL SERVICES PROCUREMENT**

830 MoDOT Drive (physical address, zip 65109)

P.O. Box 270 (mailing address, zip 65102)

**JEFFERSON CITY, MO**

REQUEST NO.	3-140422BR
DATE	April 3, 2014
PAGE NO.	1
NO. OF PAGES	29

SEALED BIDS, SUBJECT TO THE ATTACHED CONDITIONS WILL BE RECEIVED AT THIS OFFICE IN JEFFERSON CITY, MO, UNTIL

**2:00 p.m., Local Time, April 22, 2014**

AND THEN PUBLICLY OPENED AND READ FOR FURNISHING THE FOLLOWING SUPPLIES OR SERVICES.

**BIDS TO BE BASED F.O.B. MISSOURI DEPARTMENT OF TRANSPORTATION**

Submit net bid as cash discount stipulations will not be considered

Various MoDOT Locations

DEFINITE DELIVERY DATE SHOULD BE SHOWN. THE BIDDER MUST SIGN AND RETURN BEFORE DATE AND TIME SET FOR OPENING. **ALL BIDS SHOULD BE EXTENDED AND TOTALED.****BUYER:** Beth Rodeman**BUYER TELEPHONE:** 573-526-2744**BUYER EMAIL:**

Elizabeth.Rodeman@modot.mo.gov

**SUPPLIES OR SERVICES****TRUCK MOUNTED ATTENUATORS (TMA's) AND TRAILER MOUNTED ATTENUATORS (TrMA's)**

To establish a contract to furnish Truck Mounted Attenuators (TMA's) and Trailer Mounted Attenuators (TrMA's) with an effective date from date of award through April 30, 2015.

**Note:** It is the sole responsibility of the Bidder to check MoDOT's website for any and all addendums throughout the bid process.**Return sealed bid to the address shown at the top of this page.**

(SEE ATTACHED FOR TERMS, CONDITIONS, AND INSTRUCTIONS)

*In compliance with the above Request For Bid, and subject to all conditions thereof, the undersigned Bidder agrees to furnish and deliver any or all the items on which prices were bid within the timeframe specified herein, after receipt of formal purchase order.***Date:** \_\_\_\_\_**Firm Name:** \_\_\_\_\_**Telephone No.:** \_\_\_\_\_**Address:** \_\_\_\_\_**Fax No.:** \_\_\_\_\_**By (Signature):** \_\_\_\_\_**Email Address:** \_\_\_\_\_**Type/Print Name** \_\_\_\_\_**Is your firm MBE certified?** ☐ Yes ☐ No**Title:**  
**Is your firm WBE certified?** ☐ Yes ☐ No

## 1. INTRODUCTION AND GENERAL INFORMATION

### 1.1 Introduction:

- 1.1.1 This Request for Bid (RFB) seeks bids from qualified organizations to provide TRUCK MOUNTED ATTENUATORS (TMA's) AND TRAILER MOUNTED ATTENUATORS (TrMA's) MEETING NCHRP 350 TEST LEVEL 3 for use by the Missouri Highways and Transportation Commission (MHTC), acting by and through its operating arm, the Missouri Department of Transportation (MoDOT). The effective date shall be from the date of award through April 30, 2015.

Each bid must be in a sealed envelope, and must be mailed or delivered by courier to the Buyer at the below listed address, on or before the date and time listed herein for receipt of bids. Emailed or faxed bids will not be accepted.

#### **BUYER:**

Beth Rodeman, General Services Specialist  
Missouri Department of Transportation, General Services  
830 MoDOT Drive (physical address, zip code 65109)  
P.O. Box 270 (mailing address, zip code 65102)  
Jefferson City, MO  
PHONE: 573-526-2744

Written Questions: All questions regarding the RFB shall be submitted to the buyer, Beth Rodeman, at fax number 573-526-1218 or e-mail address [elizabeth.rodeman@modot.mo.gov](mailto:elizabeth.rodeman@modot.mo.gov). Questions should be submitted no later than Wednesday, April 16, 2015.

Bid forms, addendums, and additional information may be electronically downloaded at no charge from MoDOT's website at <http://www.modot.org/business/surplus/Fleet%20Buyers%20Web%20Page/TruckMountedAttenuator.htm>

Notice to Bidders: MoDOT may issue an addendum(s) which will be posted on-line for vendors to retrieve. It is the sole responsibility of the Bidder to check MoDOT's website for any and all addendums throughout the bid process.

### 1.2 General Information:

- 1.2.1 This document constitutes an invitation for competitive, sealed bids for the procurement of TMA's and TrMA's as set forth herein.
- 1.2.2 Organization: This RFB is divided into the following parts:
- 1) Introduction and General Information
  - 2) Scope of Work
  - 3) Bid Submission
  - 4) Pricing Pages
  - 5) Vendor Information and Preference Certification Form
  - 6) Notice of Cooperative Purchasing
  - 7) Terms and Conditions
  - 8) Specifications

## **2. SCOPE OF WORK**

### **2.1 General Requirements:**

- 2.1.1 The Bidder shall provide TMA's and TrMA's on an as needed, if needed basis for the MHTC and MoDOT, in accordance with the provisions and requirements stated herein.
- 2.1.2 The Bidder shall provide all deliverables/services to the sole satisfaction of MoDOT.
- 2.1.3 No estimated quantities are given as part of this bid. MoDOT does not guarantee any specific quantities that may be required to be provided by the Bidder.
- 2.1.4 MoDOT reserves the right to obtain "like or similar" products as specified herein from other manufacturers, exclusive of the contract, when use of such products is deemed in the best interest of MoDOT.
- 2.1.5 Unless otherwise specified herein, the Bidder shall furnish all material, labor, facilities, equipment, and supplies necessary to provide the deliverables/services required herein.
- 2.1.6 MoDOT reserves the right to reject any or all bids, and to accept or reject any items thereon, and to waive technicalities. In case of error in the extension of prices in the bid, unit prices will govern.

### **2.2 Specific Requirements:**

- 2.2.1 The Bidder shall provide MoDOT with TMAs and TrMAs in accordance with the following requirements upon placement of an order for such by MoDOT.
  - a. All materials, equipment, and/or services bid upon must comply with the attached MoDOT Specification 350TMA01A and any other provisions outlined in the solicitation documents.
  - b. All truck and trailer mounted attenuators shall be NCHRP 350, level 3, tested for all mandatory and optional offset tests. Approval letters for NCHRP350 test level 3 compliance shall be submitted with your bid.
  - c. The Bidder shall provide MoDOT with 2 Operator's manuals in hard copy, 4 Parts Books (2 hardcover books and 2 CD's), and 2 Technical Service Manuals for each TMA and/or TrMA.
  - d. The Bidder shall provide all other available manuals, if any, including but not limited to any solar communications manuals and software operations manuals.
  - e. The Bidder shall provide additional copies of Operator's manuals periodically as they are updated over the life of the contract.
  - f. An electronic source for all manuals and parts books shall be provided upon request by MoDOT. (i.e. Internet site, jump drive, CD, etc.)
  - g. The Bidder shall provide a contact name, along with the contact person's physical address and an 800 number. The contact person must be accessible for MoDOT representatives to contact twenty-four (24) hours per day, and seven (7) days per week for technical assistance.
- 2.2.2 Replacement Parts: The Bidder shall supply all replacement/repair parts necessary, meeting the requirements of the TMA and TrMA specifications attached hereto.
  - a. A simple easy to follow replacement parts assembly instruction book should be provided.
- 2.2.3 Combination TMA with Flashing Arrow Panel (FAP): MoDOT routinely bids and contracts FAPs. Some TMA vendors provide TMA systems which incorporate FAPs. Vendors can provide bids for. Any proposed FAP shall be

included in the parts lists with detailed information. These will be considered and approved under current FAP specifications as required below.

- a. The Bidder shall provide the FAP in accordance with the attached specifications: MGS 06-08A and any other provisions outlined in this document.
- b. TMA / FAP combinations must include all attachment hardware for FAP.
- c. The Bidder shall provide MoDOT with 2 Operator's Manuals in hard copy, 4 Parts Books (2 hardcover books and 2 CD's), and 2 Technical Service Manuals for each FAP.

2.2.4 Combination TrMA with Flashing Arrow Panel (FAP): MoDOT routinely bids and contracts FAPs. Some TrMA vendors provide TrMA systems which incorporate FAPs. Vendors can provide bids for TrMA / FAP combinations. Any proposed FAP shall be included in the parts lists with detailed information. These will be considered and approved under current FAP specifications as required below.

- a. The Bidder shall provide FAP in accordance with the attached specifications MGS 06-06A and any other provisions outlined in this document.
- b. TrMA / FAP combinations must include all attachment hardware for FAP.
- c. The Bidder shall provide MoDOT with 2 Operator's Manuals in hard copy, 4 Parts Books (2 hardcover books and 2 CD's), and 2 Technical Service Manuals for each FAP.

## **2.3 Training Requirements:**

2.3.1 The Bidder shall provide training for all equipment specified herein. At a minimum, training shall consist of the following:

- a. A qualified service technician shall conduct training at each district where items are delivered, or at an off-site location, at the Bidder's expense.
  - 1) The Bidder shall provide training to the MoDOT operators and mechanics of the equipment. The Bidder's training must cover safe operation, warranty coverage, and routine/preventative maintenance.
  - 2) The Bidder shall provide training within one (1) month after delivery and acceptance.
  - 3) The Bidder shall provide all training materials at no additional cost to MoDOT.
  - 4) The Bidder shall contact each applicable district to schedule the training classes.
  - 5) If requested by MoDOT, the Bidder shall provide repeat training classes at the location the training initially occurred. Such repeat training classes shall be provided by the Bidder at no additional cost to MoDOT.

## **2.4 Delivery Requirements:**

2.4.1 The Bidder shall deliver the TMAs and TrMAs as specified herein to various locations throughout the state as specified below. The Bidder shall deliver such TMAs and TrMAs F.O.B. destination.

- a. St. Joseph, Missouri 64502
- b. Macon, Missouri 63552

- c. Hannibal, Missouri 63401
- d. Lee's Summit, Missouri 64064
- e. Jefferson City, Missouri 65102
- f. Ballwin, MO 63021
- g. Joplin, Missouri 64802
- h. Springfield, Missouri 65801
- i. Willow Springs, Missouri 65793
- j. Sikeston, Missouri 63801

2.4.2 The Bidder shall insure the TMAs and TrMAs are delivered complete and ready for use. TMAs and TrMAs must be delivered **fully assembled** with the only exceptions of the necessary hardware required to complete the connection of the TMAs to the host vehicle and the mounting of the FAP. All hardware necessary for the final installation/connection and detailed installation instructions to aid MoDOT mechanics with final assembly must be included with the fully assembled unit.

2.4.3 The Bidder shall deliver TMAs and TrMAs at the specified location within 60 calendar days after receipt of order.

2.4.4 Deliveries will be received Monday through Friday, 8:00 a.m. through 2:00 p.m. local time, excluding holidays. The Bidder shall provide MoDOT with at least twenty-four (24) hours advance notice prior to arrival at the delivery point. Products arriving after 3:00 p.m. will not be unloaded until the following workday. No material will be received on Saturday, Sunday or state holidays.

- a. The Bidder agrees to pay all transportation charges on the TMAs and TrMAs as FOB - Destination. Freight costs must be included in the unit price bid and not listed as a separate line item. MoDOT will not pay additional surcharges.
- b. Any demurrage is to be paid by the Bidder direct to the carrier.

## 2.5 Liquidated Damage Requirements:

2.5.1 The Bidder shall agree and understand that providing TMAs and TrMAs in accordance with the requirements stated herein is considered critical to the efficient operations of MoDOT. However, since the amount of actual damages would be difficult to establish in the event the Bidder fails to comply with the contractual requirements, the Bidder shall agree and understand that the amount identified below as liquidated damages shall be reasonable and fair under the circumstances.

- a. In the event the Bidder fails to provide TMAs and TrMAs in accordance with the contractual requirements specified herein, the Bidder shall be assessed liquidated damages in the amount of \$100.00 per day, per complete order for each such delinquent day.
- b. The Bidder shall further agree and understand that such liquidated damages shall either be deducted from the total amount due the Bidder or paid by the Bidder as a direct payment to MoDOT, at the sole discretion of MoDOT.
- c. The Bidder shall understand that the liquidated damages described herein shall not be construed as a penalty.
- d. The Bidder shall agree and understand that all assessments of liquidated damages shall be within the discretion of each District as a separate entity, and shall be in addition to, not in lieu of, the rights of the

State of Missouri to pursue other appropriate remedies. The Bidder shall understand and agree that each District's decision shall be individual, final, and without recourse.

- e. The Bidder shall agree and understand that if a product(s) is rejected due to not meeting specifications, all costs associated with returning the product to the Bidder shall be paid by the Bidder.

## **2.7 Contract/Purchase Order:**

- 2.7.1 The contract expresses the complete agreement of the parties and performance shall be governed solely by the specifications and requirements contained therein. Any change, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the Bidder and the duly authorized representative of the MHTC, by a modified purchase order prior to the effective date of such modification. The Bidder expressly and explicitly understands and agrees that no other method and/or no other document, including correspondence, acts, and oral communications by or from any person, shall be used or construed as an amendment or modification.

## **2.8 Invoicing and Payment Requirements:**

- 2.8.1 The Bidder shall submit an itemized invoice to the applicable requesting address for the completion of deliverables, as specified herein.
- 2.8.2 Each invoice should be itemized in accordance with items listed on the purchase order and/or contract. The statewide financial management system has been designed to capture certain receipt and payment information. Therefore, each invoice submitted must reference the purchase order number and must be itemized in accordance with items listed on the purchase order. Failure to comply with this requirement may delay processing of invoices for payment.
- 2.8.3 The Bidder shall understand and agree MoDOT reserves the right to make contract payments to the Bidder through electronic funds transfer (EFT). Therefore, prior to any payments becoming due under the contract, the Bidder must return a completed state Vendor Input ACH/EFT Application, which is downloadable from the Vendor Services Portal at: <https://www.vendorservices.mo.gov/vendorservices/Portal/Default.aspx>. Each Bidder invoice must be on the Bidder's original descriptive business invoice form and must contain a unique invoice number. The invoice number will be listed on the state's Vendor Payment Website to enable the Bidder to properly apply state payments to invoices. The Bidder must comply with all other invoicing requirements stated in the RFB.
- 2.8.4 The Bidder shall be paid in accordance with the firm, fixed prices stated on the pricing pages of this document after completion of deliverables specified herein and acceptance by MoDOT.
- 2.8.5 Other than the payment specified above, no other payments or reimbursements shall be made to the Bidder for any reason whatsoever.
- 2.8.6 Unless otherwise provided for in the solicitation documents, payment for all equipment, supplies, and/or services required herein shall be made in arrears. The MHTC shall not make any advance deposits.
- 2.8.7 The MHTC assumes no obligation for equipment, supplies, and/or services shipped or provided in excess of the quantity ordered. Any authorized quantity is subject to the MHTC's rejection and shall be returned at the Bidder's expense.
- 2.8.8 The MHTC reserves the right to purchase goods and services using the state-purchasing card.

2.8.9 MoDOT is exempt from paying Missouri Sales Tax, Missouri Use Tax and Federal Excise Tax. However, the Bidder may themselves be responsible for the payment of taxes on materials they purchase to fulfill the contract.

## **2.9 Other Contractual Requirements:**

2.9.1 Contract Period - The contract shall commence from the date of award through April 30, 2015, with up to three (3) one-year renewal option periods, or any portion therein. If the option for renewal is exercised by MoDOT, the Bidder shall agree to all terms and conditions of the RFB and all subsequent amendments. Renewal options are at the sole discretion of MoDOT.

2.9.2 Renewal Periods - If the option for renewal is exercised by MoDOT, the Bidder shall agree that the percentages for the renewal period shall not exceed the maximum percentage for the applicable renewal period stated herein.

- a. If renewal percentages are not provided, the prices during renewal periods shall be the same as during the original contract period.
- b. MoDOT does not automatically exercise its option for renewal based upon the maximum percentage of increase without documented justification supporting an increase, and reserves the right to offer or to request renewal of the contract at a percentage less than the maximum percentage stated.
- c. In the event MoDOT exercises its option(s) to renew the contract, the requirements for future years shall be basically similar.

2.9.3 Escalation Clause - In the event the Bidder requests a price increase during the contract period, either the original contract period or any contract renewal period, the Bidder must provide a written request and documentation justifying the need for a price increase, and the amount of such price increase. MoDOT will review the Bidder's written request and documentation, and decide if a price increase is to be granted at that particular time. The Bidder shall understand and agree that MoDOT's decision shall be final and without recourse.

- a. No price increase shall be granted during the first 3 months of the original contract period, or if applicable, first 3 months of a contract renewal period.
- b. In the event a price increase is granted due to an approved escalation, the renewal percentage shall be based upon the current contract value.

2.9.4 Inspection and Acceptance: MoDOT reserves the right to inspect the material at the point of manufacture, intermediate storage point, or at a destination which shall be at the discretion of MoDOT.

- a. No equipment, supplies, and/or services received by MoDOT pursuant to a contract shall be deemed accepted until MoDOT has had reasonable opportunity to inspect said equipment, supplies, and/or services.
- b. All equipment, supplies, and/or services which do not comply with the specifications and/or requirements or which are otherwise unacceptable or defective may be rejected. In addition, all equipment, supplies, and/or services which are discovered to be defective or which do not conform to any warranty of the Bidder upon inspection (or at any later time if the defects contained were not reasonably ascertainable upon the initial inspection) may be rejected.
- c. The MHTC reserves the right to return any such rejected shipment at the Bidder's expense for full credit or replacement and to specify a reasonable date by which replacements must be received.

- d. The MHTC's right to reject any unacceptable equipment, supplies, and/or services shall not exclude any other legal, equitable or contractual remedies the MHTC may have.

#### 2.9.5 Insurance Requirements:

- a. The Bidder is directed to the "*Standard Bid Provisions, General Terms and Conditions and Special Terms and Conditions*" attached to the bid documents, regarding the amount and types of insurance certificates required to be submitted by the Bidder in accordance with Pricing Pages Options B-D, regarding On-Site Installation, for each item.

### **3. BID SUBMISSION**

#### **3.1 Bid Submission Information:**

- 3.1.1 All bids must be received in a sealed envelope/package clearly marked RFB 3-140422BR,TMA and TrMA Bid".
- 3.1.2 All bids must be received at the office of the Buyer as outlined in Section 1. "INTRODUCTION AND GENERAL INFORMATION".
- 3.1.3 The Bidder may withdraw, modify or correct his/her bid after it has been deposited with MoDOT provided such request is submitted in writing and received at the location designated for the bid opening prior to the date and time specified for opening bids. Such a request received as specified will be attached to the bid and the bid will be considered to have been modified accordingly. No bid may be modified after the date and time specified for the opening of bids.
- 3.1.4 Bids must be completed on the forms provided herein, properly signed and with all items filled out. Do not change the wording of the bid forms and do not add words to the bid forms. Unauthorized conditions, limitations or provisions attached to the bid will be cause for rejection of the bid.
- 3.1.5 Submit only the original signed copy of the bid, along with the original signed copy of any and all addenda.
- 3.1.6 The Bidder shall submit the following with the bid:
  - a. A complete list or catalog describing all available training materials related to the items being proposed.
  - b. A complete options list and/or catalog describing parts with detailed pricing information for each make/model of TMA and/or TrMA being proposed.
  - c. Warranty information.
  - d. Descriptive literature and specifications showing the exact equipment being proposed.
  - e. An electronic source for this information should be provided as well. (i.e. Internet site, jump drive, CD, etc.)

#### 3.1.7 Open Competition / Request For Bid Document:

- a. It shall be the Bidder's responsibility to ask questions, request changes or clarification, or otherwise advise MoDOT if any language, specifications or requirements of an RFB appear to be ambiguous, contradictory, and/or arbitrary, or appear to inadvertently restrict or limit the requirements stated in the RFB to a single source. Any and all communication from Bidders regarding specifications, requirements, competitive bid process, etc., must be directed to the buyer from MoDOT, unless the RFB specifically refers the Bidder to another contact. Such communication should be received at least five (5) working days prior to the official bid opening date.



- b. Every attempt shall be made to ensure that the Bidder receives an adequate and prompt response. However, in order to maintain a fair and equitable bid process, all Bidders will be advised, via the issuance of an amendment to the RFB, of any relevant or pertinent information related to the procurement. Therefore, Bidders are advised that unless specified elsewhere in the RFB, any questions received less than five (5) working days prior to the RFB opening date may not be answered.
- c. Bidders are cautioned that the only official position of the MoDOT is that which is issued by MoDOT in the RFB or an amendment thereto. No other means of communication, whether oral or written, shall be construed as a formal or official response or statement.
- d. MoDOT monitors all procurement activities to detect any possibility of deliberate restraint of competition, collusion among Bidders, price-fixing by Bidders, or any other anticompetitive conduct by Bidders which appears to violate state and federal antitrust laws. Any suspected violation shall be referred to the Missouri Attorney General's Office for appropriate action.

3.1.8 Bid Review: Bids will be reviewed to determine if the bid complies with the mandatory requirements.

3.1.9 Multiple Award Contract:

- a. This is expected to be a 'Multiple Award' bid where no one Bidder may be the apparent lowest and best bid with the capacity to furnish the TMA's and TrMA's as described herein.
- b. Several Bidders may receive formal contracts to provide TMA's and TrMA's as described herein on an as needed, if needed basis. Award will not be based solely on lowest price.
- c. Requestors at various locations will have sole responsibility for the discretion of all purchasing decisions. The criteria used to determine the lowest and best bid for the requesting location may include, but not be limited to, Bidder pricing, location of servicing dealers, past performance of servicing dealers, and past performance of various makes and models of TMA's and TrMA's.

3.1.10 MHTC reserves the right to reject any or all bids and no award is final until formally approved by MHTC.

- a. Notification of award shall be at the time the tabulation is posted to the Internet. *It is the sole responsibility for all Bidders to check the website for bid results.*

#### 4. PRICING PAGES

- 4.1** The Bidder shall provide firm, fixed prices in the table below for the original contract period for providing the deliverables/services in accordance with the provisions and requirements of this RFB. ***All costs***, including freight, associated with providing the required deliverables/services shall be included in the prices stated below. Sign where indicated below and return with all required solicitation documents.

**ITEM # 1 - New Truck Mounted Attenuator (TMA) meeting the attached MoDOT Specification 350TMA01A.**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete TMA \_\_\_\_\_  
(this shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district EACH \$ \_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district EACH \$ \_\_\_\_\_

Outright Purchase of **more than six (6)** units per district EACH \$ \_\_\_\_\_

***For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.***

***For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.***

**Option A** – Hydraulic power system for use with the truck hydraulic system EACH \$ \_\_\_\_\_  
in lieu of electric power system

**Option B** - On-Site Installation of **one (1) to three (3)** units per district EACH \$ \_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district EACH \$ \_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district EACH \$ \_\_\_\_\_

**Option E** - Additional Option Available to be used with TMA, as specified below: EACH \$ \_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

**(Bidder may duplicate this page if needed for pricing on multiple makes and models.)**

**ITEM # 2 - New Combination Truck Mounted Attenuator (TMA) with Flashing Arrow Panel (FAP) with Wired Controller / LED meeting the attached MoDOT Specifications 350TMA01A and MGS-06-08A**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete combination TMA with FAP \_\_\_\_\_  
(this shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **more than six (6)** units per district      EACH \$ \_\_\_\_\_

*For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.*

*For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.*

**Option A** – Hydraulic power system for use with the truck hydraulic system      EACH \$ \_\_\_\_\_  
in lieu of electric power system

**Option B** - On-Site Installation of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district      EACH \$ \_\_\_\_\_

**Option E** - Additional Option Available to be used with TMA, as specified below: EACH \$ \_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

(Bidder may duplicate this page if needed for pricing on multiple makes and models.)

**ITEM # 3- New Combination Truck Mounted Attenuator (TMA) with Flashing Arrow Panel (FAP) with Wireless Controller / LED meeting the attached MoDOT Specifications 350TMA01A and MGS-06-08A**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete combination TMA with FAP \_\_\_\_\_  
(this shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **more than six (6)** units per district      EACH \$ \_\_\_\_\_

***For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.***

***For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.***

**Option A** – Hydraulic power system for use with the truck hydraulic system      EACH \$ \_\_\_\_\_  
in lieu of electric power system

**Option B** - On-Site Installation of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district      EACH \$ \_\_\_\_\_

**Option E** - Additional Option Available to be used with TMA, as specified below: EACH \$ \_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

**(Bidder may duplicate this page if needed for pricing on multiple makes and models.)**

**ITEM #4 –New Trailer Mounted Attenuator (TrMA) meeting the attached MoDOT Specification 350TMA01A**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete TMA \_\_\_\_\_

(This shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district EACH \$\_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district EACH \$\_\_\_\_\_

Outright Purchase of **more than six (6)** units per district EACH \$\_\_\_\_\_

***For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.***

***For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.***

**Option A** – Hydraulic power system for use with the truck hydraulic system in lieu of electric power system EACH \$\_\_\_\_\_

**Option B** - On-Site Installation of **one (1) to three (3)** units per district EACH \$\_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district EACH \$\_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district EACH \$\_\_\_\_\_

**Option E** - Additional Option Available to be used with TMA, as specified below: EACH \$\_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

**(Bidder may duplicate this page if needed for pricing on multiple makes and models.)**

**ITEM #5 – New Combination Trailer Mounted Attenuator (TrMA) with Flashing Arrow Panel (FAP) with Wired Controller / LED meeting the attached MoDOT Specifications 350TMA01A and MGS-06-06A**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete TMA \_\_\_\_\_

(This shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **more than six (6)** units per district      EACH \$ \_\_\_\_\_

***For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.***

***For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.***

**Option A** – Hydraulic power system for use with the truck hydraulic system      EACH \$ \_\_\_\_\_  
in lieu of electric power system

**Option B** - On-Site Installation of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district      EACH \$ \_\_\_\_\_

**Option E** - Additional Option Available to be used with TMA, as specified below: EACH \$ \_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

**(Bidder may duplicate this page if needed for pricing on multiple makes and models.)**

**ITEM #6 – New Combination Trailer Mounted Attenuator (TrMA) with Flashing Arrow Panel (FAP) with Wireless Controller / LED meeting the attached MoDOT Specifications 350TMA01A and MGS-06-06A**

Manufacturer: \_\_\_\_\_

Model number: \_\_\_\_\_

Total weight of the complete TMA \_\_\_\_\_  
(This shall include all pins, bolts and hardware  
to mount the TMA unit to the TMA support vehicle).

**NET DELIVERED PRICE** to the locations in the State of Missouri (listed in section 2.4, Delivery Requirements)

Outright Purchase of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

Outright Purchase of **more than six (6)** units per district      EACH \$ \_\_\_\_\_

***For optional items listed below, the TMA and TrMA manufacturer(s) shall provide a factory representative to provide installation with the assembly and hook-up of the units if so requested.***

***For options B-D, Bidders shall comply with the insurance clause on page 3 of the Terms and Conditions.***

Option A – Hydraulic power system for use with the truck hydraulic system      EACH \$ \_\_\_\_\_  
in lieu of electric power system

Option B - On-Site Installation of **one (1) to three (3)** units per district      EACH \$ \_\_\_\_\_

**Option C** - On-Site Installation of **four (4) to six (6)** units per district      EACH \$ \_\_\_\_\_

**Option D** - On-Site Installation of **more than six** units per district      EACH \$ \_\_\_\_\_

Option E - Additional Option Available to be used with TMA, as specified below: EACH \$ \_\_\_\_\_  
(if additional options are available, please indicate those on a separate page and attach hereto)

\_\_\_\_\_  
\_\_\_\_\_

**Delivery Time:** Anticipated maximum days for delivery: \_\_\_\_\_ days after receipt of order.

The Bidder shall indicate below the percent (%) discount off Manufacturers Suggested Retail Prices (MSRP) for all TMA and TrMA options and replacement parts not listed above

**Percent discount off MSRP for all Data Book or Pricing Guide Options:** \_\_\_\_\_ % discount

**(Bidder may duplicate this page if needed for pricing on multiple makes and models.)**

**4.2**     **Warranty Information** – Every TMA and TrMA must be covered by a standard one-year warranty which must include, but not be limited to, replacement parts, and on-site labor and travel expenses as deemed necessary by MoDOT.

**Standard Warranty Coverage includes the following, in addition to the basic requirement as stated above:**

(Example: Bumper to Bumper)

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**Extended Warranty, if available:**    (Example: Bumper to Bumper - What does it cover? What is the coverage period?)

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Price: \$ \_\_\_\_\_

(Bidder may duplicate this page if needed for pricing on multiple makes and models.)



**4.4 Renewal Periods:** The Bidder shall provide below the maximum percentage of increase or decrease for the renewal periods. The percentage shall be computed against the **original contract period prices** for each renewal period unless a price increase is granted due to an approved escalation, in which case the renewal percentage shall be based upon the current contract prices. If a renewal percentage is not provided, the prices for the renewal periods shall be the same as the original contract period. Furthermore, the Bidder is advised that MoDOT does not automatically grant increases at the time of contract renewal. If an increase is requested, documentation of need must be provided at the time of renewal. If the option for renewal is exercised by MoDOT, the Bidder shall agree to all terms and conditions of the RFB and all subsequent amendments.

**1<sup>st</sup> Renewal Period**        \_\_\_\_\_% of maximum increase and/or \_\_\_\_\_% of maximum decrease.

**2<sup>nd</sup> Renewal Period**        \_\_\_\_\_% of maximum increase and/or \_\_\_\_\_% of maximum decrease.

**3<sup>rd</sup> Renewal Period**        \_\_\_\_\_% of maximum increase and/or \_\_\_\_\_% of maximum decrease.

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Name of the Bidder's Firm

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Signature of Authorized Representative

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Date Signed

# VENDOR INFORMATION & PREFERENCE CERTIFICATION FORM

## Vendor Information

All Bidders must furnish **ALL** applicable information requested below

<b>Vendor Name/Mailing Address:</b>  Email Address:	<b>Vendor Contact Information (including area codes):</b> Phone #: Cellular #: Fax #:
<b>Printed Name of Responsible Officer or Employee:</b>	<b>Signature:</b>
<b>For Corporations</b> - State in which incorporated:	<b>For Others</b> - State of domicile:

If the address listed in the Vendor Name/Mailing Address block above is not located in the State of Missouri, list the address of Missouri offices or places of business:

*If additional space is required, please attach an additional sheet and identify it as **Addresses of Missouri Offices or Places of Business.***

**M/WBE INFORMATION:** List all certified Minority or Women Business Enterprises (**M/WBE**) utilized in the fulfillment of this bid. Include percentages for subcontractors and identify the M/WBE certifying agency:

<u>M/WBE Name</u>	<u>Percentage of Contract</u>	<u>M/WBE Certifying Agency</u>
_____	_____	_____
_____	_____	_____

*If additional space is required, please attach an additional sheet and identify it as **M/WBE Information***

## Preference Certification

All Bidders must furnish **ALL** applicable information requested below

<b>GOODS/PRODUCTS MANUFACTURED OR PRODUCED IN USA:</b> If any or all of the goods or products offered in the attached bid which the Bidder proposes to supply to the MHTC are <b>not</b> manufactured or produced in the "United States", or imported in accordance with a qualifying treaty, law, agreement, or regulation, list below, by item or item number, the country other than the United States where each good or product is manufactured or produced.	
Item (or item number)	Location Where Item is Manufactured or Produced

*If additional space is required, please attach an additional sheet and identify it as **Location Products are Manufactured or Produced.***

**MISSOURI SERVICE-DISABLED VETERAN BUSINESS:** Please complete the following if applicable. Additional information may be requested if preference is applicable. See below definitions for qualification criteria:

**Service-Disabled Veteran** is defined as any individual who is disabled as certified by the appropriate federal agency responsible for the administration of veterans' affairs.

**Service-Disabled Veteran Business** is defined as a business concern:

- Not less than fifty-one (51) percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than fifty-one (51) percent of the stock of which is owned by one or more service-disabled veterans; and
- The management and daily business operations of which are controlled by one or more service-disabled veterans.

<u>Veteran Information</u>	<u>Business Information</u>
Service-Disabled Veteran's Name (Please Print)	Service-Disabled Veteran Business Name
Service-Disabled Veteran's Signature	Missouri Address of Service Disabled Veteran Business

## **NOTICE OF COOPERATIVE PURCHASING**

**MODOT IS INTERESTED IN ASSISTING MISSOURI GOVERNMENTAL ENTITIES, ETC. IN PURCHASING EQUIPMENT, VARIOUS MATERIALS, AND SUPPLIES THAT MEET THE MISSOURI DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.**

Each Bidder is asked to indicate below whether they would be willing to offer Truck Mounted Attenuators (TMA's) and Trailer Mounted Attenuators (TrMA's) listed in the attached "Request for Bid" for sale to these local political entities at the same bid price offered to MoDOT.

It is understood MoDOT will not issue purchase orders, accept delivery nor make payment for these items ordered by any of these agencies. It is further understood the price is based on the Truck Mounted Attenuators (TMA's) and Trailer Mounted Attenuators (TrMA's) meeting MoDOT specifications. Any added options, deletions, or extra freight costs would be negotiated between the local agency and the successful vendor.

Indicate below whether your company is willing to offer such cooperative purchasing for Missouri counties, cities or other political entities.

YES \_\_\_\_\_ NO \_\_\_\_\_

If the price varies throughout the state on MoDOT bids because of different delivery destinations, please indicate the price F.O.B. your location that would be offered as described.

F.O.B. Location \_\_\_\_\_

Indicate the deadline date that orders will be accepted. \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

E-MAIL \_\_\_\_\_

PHONE NUMBER \_\_\_\_\_

SIGNATURE \_\_\_\_\_

TITLE \_\_\_\_\_

DATE \_\_\_\_\_

**Missouri Highways and Transportation Commission  
Standard Bid Provisions, General Terms and Conditions and Special Terms and Conditions**

**STANDARD SOLICITATION PROVISIONS**

- a. The solicitation for the procurement of the supplies referenced therein, to which these "Standard Bid Provisions, General Terms and Conditions and Special Terms and Conditions" are attached, is being issued under, and governed by, the provisions of Title 7 – Missouri Department of Transportation, Division 10 – Missouri Highways and Transportation Commission, Chapter 11 – Procurement of Supplies, of the Code of State Regulations. The Missouri Highways and Transportation Commission (**MHTC**), acting by and through its operating arm, the Missouri Department of Transportation (**MoDOT**), draws the Bidder's attention to said 7 CSR 10-11 for all the provisions governing solicitation and receipt of bids/quotes and the award of the contract pursuant to this solicitation.
- b. All bids/quotes must be signed with the firm name and by a responsible officer or employee. Obligations assumed by such signature must be fulfilled.

**GENERAL TERMS AND CONDITIONS**

**Definitions**

Capitalized terms as well as other terms used but not defined herein shall have the meaning assigned to them in section 7 CSR 10-11.010 Definition of Terms.

**Nondiscrimination**

- a. The Contractor shall comply with all state and federal statutes applicable to the Contractor relating to nondiscrimination, including, but not limited to, Chapter 213, RSMo; Title VI and Title VII of Civil Rights Act of 1964 as amended (42 U.S.C. Sections 2000d and 2000e, *et seq.*); and with any provision of the "Americans with Disabilities Act" (42 U.S.C. Section 12101, *et seq.*).
- b. **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, MHTC shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
  - i. withholding of payments to the Contractor under the contract until the Contractor complies, and/or,
  - ii. cancellation, termination or suspension of the contract, in whole or in part.

**Contract/Purchase Order**

- a. By submitting a bid/quote, the Bidder agrees to furnish any and all equipment, supplies and/or services specified in the solicitation documents, at the prices quoted, pursuant to all requirements and specifications contained therein.
- b. A binding contract shall consist of: (1) the solicitation documents, amendments thereto, and/or Best and Final Offer (BAFO) request(s) with any changes/additions, (2) the Contractor's bid response, and (3) the MHTC's acceptance of the bid by post-award contract or purchase order.
- c. A notice of award does not constitute an authorization for shipment of equipment or supplies or a directive to proceed with services. Before providing equipment, supplies and/or services, the Contractor must receive a properly authorized notice to proceed and/or purchase order.

**Applicable Laws and Regulations**

- a. The contract shall be construed according to the laws of the State of Missouri. The Contractor shall comply with all local, state, and federal laws and regulations related to the performance of the contract. The exclusive venue for any legal proceeding relating to or arising, out of the contract shall be in the Circuit Court of Cole County, Missouri.
- b. The Contractor must be registered and maintain good standing with the Secretary of State of the State of Missouri, Missouri Department of Revenue, and other regulatory agencies, as may be required by law or regulations. Prior to the issuance of a purchase order and/or notice to proceed, the Contractor may be required to submit to MHTC a copy of their current Authority Certificate from the Secretary of State of the State of Missouri and/or a copy of their Certificate of No Tax Due from the Missouri Department of Revenue.
- c. Prior to the issuance of a purchase order and/or notice to proceed, all **out-of-state** Contractors **providing services** within the state of Missouri must submit to MHTC a copy of their current Transient Employer Certificate from the Missouri Department of Revenue, in addition to a copy of their current Authority Certificate from the Secretary of State of the State of Missouri.

**Executive Order:**

The Contractor shall comply with all the provisions of Executive Order 07-13, issued by the Honorable Matt Blunt, Governor of Missouri, on the sixth (6<sup>th</sup>) day of March, 2007. This Executive Order, which promulgates the State of Missouri's position to not tolerate persons who contract with the state engaging in or supporting illegal activities of employing individuals who are not eligible to work in the United States, is incorporated herein by reference and made a part of this Agreement.

- 1) "By signing this Agreement, the Contractor hereby certifies that any employee of the Contractor assigned to perform services under the contract is eligible and authorized to work in the United States in compliance with federal law."
- 2) In the event the Contractor fails to comply with the provisions of the Executive Order 07-13, or in the event the Commission has reasonable cause to believe that the contractor has knowingly employed individuals who are not eligible to work in the United States in violation of federal law, the Commission reserves the right to impose such contract sanctions as it may determine to be appropriate, including but not limited to contract cancellation, termination or suspension in whole or in part or both.
- 3) The Contractor shall include the provisions of this paragraph in every subcontract. The Contractor shall take such action with respect to any subcontract as the Commission may direct as a means of enforcing such provisions, including sanctions for noncompliance.

**Preferences**

- a. In the evaluation of bids/quotes, preferences shall be applied in accordance with 7 CSR 10-11.020(7). Contractors should apply the same preferences in selecting subcontractors. The attached document entitled "**VENDOR INFORMATION AND PREFERENCE CERTIFICATION FORM**" must be completed and returned with the solicitation documents.
- b. Bidders are encouraged to obtain minority business enterprise (MBE) and women business enterprise (WBE) participation in this work through the use of subcontractors, suppliers, joint ventures, or other arrangements that afford meaningful participation for M/WBEs. Bidders are encouraged to obtain 10% MBE and 5% WBE participation.

**Missouri Highways and Transportation Commission**  
**Standard Bid Provisions, General Terms and Conditions and Special Terms and Conditions**

**Cancellation of Contract**

The MHTC may cancel the Contract at any time for a material breach of contractual obligations or for convenience by providing Contractor with written notice of cancellation. Should the MHTC exercise its right to cancel the contract for such reasons, cancellation will become effective upon the date specified in the notice of cancellation sent to the Contractor.

**Bankruptcy or Insolvency**

Upon filing for any bankruptcy or insolvency proceeding by or against the Contractor, whether voluntarily, or upon the appointment of a receiver, trustee, or assignee, for the benefit of creditors, the Commission reserves the right and sole discretion to either cancel the Agreement or affirm the Agreement and hold the Contractor responsible for damages.

**Warranty**

The Contractor expressly warrants that all equipment, supplies, and/or services provided shall: (1) conform to each and every specification, drawing, sample or other description which was furnished to or adopted by the MHTC, (2) be fit and sufficient for the purpose expressed in the solicitation documents, (3) be merchantable, (4) be of good materials and workmanship, and (5) be free from defect.

**Status of Independent Contractor**

The Contractor represents itself to be an independent Contractor offering such services to the general public and shall not represent itself or its employees to be an employee of the MHTC. Therefore, the Contractor shall assume all legal and financial responsibility for taxes, FICA, employee fringe benefits, workers' compensation, employee insurance, minimum wage requirements, overtime, etc., and agrees to indemnify, save and hold the MHTC, its officers, agents and employees harmless from and against any and all losses (including attorney fees) and damage of any kind related to such matters.

**Non-Waiver**

If one of the parties agrees to waive its right to enforce any term of this Contract, that party does not waive its right to enforce such term at any other time or to enforce any or all other terms of this Contract.

**Indemnification**

The Contractor shall defend, indemnify and hold harmless MHTC, including its members and department employees, from any claim or liability whether based on a claim for damages to real or personal property or to a person for any matter relating to or arising out of the Contractor's performance of its obligations under the contract awarded pursuant to this solicitation.

**Missouri Highways and Transportation Commission**  
**Standard Bid/Proposal Provisions, General Terms and Conditions and Special Terms and Conditions**

**SPECIAL TERMS AND CONDITIONS**

**Insurance**

The Contractor shall maintain or cause to be maintained at Contractor's own expense commercial general liability, automobile liability, worker's compensation insurance against negligent acts, errors or omissions of the Contractor, or its subcontractors and anyone directly or indirectly employed by any of them. Any insurance policy required as specified in this Section shall be written by a company that is licensed and authorized to issue such insurance in the state of Missouri and shall provide insurance coverage for not less than the following limits of liability:

- 1) General Liability: Not less than \$500,000 for any one person in a single accident or occurrence, and not less than \$3,000,000 for all claims arising out of a single occurrence;
- 2) Automobile Liability: Not less than \$500,000 for any one person in a single accident or occurrence, and not less than \$3,000,000 for all claims arising out of a single occurrence;
- 3) Missouri State Workmen's Compensation policy or equivalent in accordance with state law.

Upon request from the Commission, the Contractor shall provide the Commission with certificates of insurance evidencing the required coverage and that such insurance is in effect.

## Missouri Department of Transportation

### PURCHASE SPECIFICATIONS FOR TRUCK MOUNTED ATTENUATORS (TMA's) AND TRAILER MOUNTED ATTENUATORS (TrMA's) MEETING NCHRP 350 TEST LEVEL 3 FOR USE BY MoDOT.

#### **Truck Mounted Attenuator (TMA) General Specifications**

All Truck Mounted Attenuators, hereinafter referred to as TMA's, shall:

1. Be a model that has been successfully crash tested and certified in accordance with National Cooperative Highway Research Project (NCHRP) 350 Test Level 3 requirement with compatible support vehicle attachment installation as approved by the engineer.
2. Be a model that has been approved by the Federal Highway Administration for meeting NCHRP 350 Test Level 3 crashworthiness.
3. Be a model that has been reviewed and approved by MoDOT. .
4. Be a model that complies with MoDOT's specifications as follows.

#### COMPONENTS OF TMA SYSTEM

The TMA shall consist of the following basic components:

1. Truck mounting bracket or plate, including any resting and locking brackets for transport. (Components that mount directly to the TMA support vehicle and permits the attenuator to be attached to the bracket or plate in a quick connect/disconnect method.)
2. TMA head frame, support frame assembly, or universal bracket extension required to meet the safety requirements stated in the TMA Manufacturer's literature (the component which is attached to the truck mounting bracket or plate, and supports the attenuating device, and is generally reusable after impact). Vendors should bid their standard support frame. Tailgate mounting systems or other systems should be bid as options or under parts list.
3. Attenuating device (that component which is sacrificed by the impacting vehicle and is not reusable after impact).

#### DESCRIPTION OF TMA SUPPORT VEHICLE

MoDOT has the need for TMAs to be installed on single and tandem axle trucks. The single axle trucks have 28,000 to 34,000 GVW, tare at 11,000 lbs to 16,000 lbs, and are ballasted to about 19,000 lbs. for TMA applications. The tandem axle trucks have a 42,000 to 62,000 GVW ratings and tare at 18,000 to 26,000 lbs. MoDOT has special applications, such as striping nurse trucks, where TMAs are needed for trucks, which may start the day at 66,000 lbs and end the day at about 24,000 lbs. MoDOT will select the best model to best meet our needs for routine and special operations with consideration of each models recommended capabilities. Vendors shall provide their recommended gross vehicle operating weight range for every model. MoDOT will

consider these operating ranges to meet special needs.

Vendor shall provide a copy of the FHWA approval letter and supporting literature regarding the FHWA approval for each model of TMA.

Vehicle fuel (saddle) tanks are typically mounted on the truck frame located at the cab. The minimum distance from the rear bumper of the truck to the rear of the fuel tank is approximately 112 inches.

## DESCRIPTION OF TMA SYSTEM

### SUPPORT VEHICLE VERSATILITY

Any truck-mounting bracket or plate permanently attached to the TMA support vehicle intended to accommodate the TMA shall permit the pintle hitch to remain on the TMA support vehicle, and not have any portion of the bracket extend beyond the bed of the support vehicle (that might interfere with slip in salt spreaders).

MoDOT has a few regions that utilize under tailgate spreaders having brine tanks mounted on the tailgates. Vendors should list mounting extensions in their parts list to accommodate the use of TMAs on these types of trucks.

MoDOT continues to consider other enhancements to TMA systems which include extensions which allow an operator to stand between the TMA and the truck to hand set and pick up traffic cones. Vendors should list this system with their parts lists.

### MOUNTING SIMPLICITY

The TMA must have the capability to be attached to or removed from the support vehicle without the aid of additional transfer or lifting equipment and be able to be moved on its own support system, consisting of a sufficient number of hand crank wheel jacks with swivel casters. Wheel jacks on the attenuator shall be swivel or retractable. The jacks shall not interfere with the operation of the unit, nor cause the unit to be illegal in width. If the wheel jacks are intended to be removable, they shall be quick connect/disconnect. If the wheel jacks are intended to be retractable, they must retract in a manner such that the bottom of the wheel on the jack does not extend below the bottom of the TMA.

### ELECTRICAL/LIGHTING SYSTEM

Electrical power for the stop, turn and tail lights on the TMA shall be via a 7-pin male connector (SAE J560 Standard, most recent revision) on the TMA to fit a 7-pin female connector on the rear of the support vehicle. The power requirements of the TMA shall be compatible with the 12-volt electrical system of the TMA support vehicle. Each TMA shall be equipped with a four lamp stop, turn and tail lighting system and a standard three lamp identification light bar system, configured in such a manner as to provide proper lighting when the attenuator is in the horizontal (protective) mode or in the vertical (traveling or non-protective) mode. Turn signal lights on the TMA shall operate independently of the brake lights. All wiring terminal connections shall be crimped, soldered, heat shrink and with weatherproof connectors.

### MAXIMUM DIMENSIONS

The overall width of the TMA assembly shall not exceed eight (8) feet (Legal width). The overall height in the vertical position (traveling mode or non-protective mode) shall not exceed thirteen (13) feet six (6) inches (Legal height).



## TMA CONTROLS

### POWER UP/DOWN

For bidding purposes, the TMA shall be equipped to raise and lower by an independent self-contained system powered by the truck electrical system. Option A is intended to delete this electric over hydraulic lift system and use the standard snow plow lift hydraulics, which are on most all trucks.

The typical MoDOT hydraulic system includes two valves, which normally control the front snowplow lift (single acting) and reversing (double acting) functions at 3 to 8 G.P.M. The valves are spring return to neutral with adjustable section flow compensator. Either or both can be used to operate the TMA. MoDOT installs some TMA's on trucks that do not have on-board hydraulics.

If the truck electrical system is used to power the raise and lower mechanism, adequate safe guards must be included in the control system to prevent a direct short from damaging the truck or the truck electrical system. The TMA supplier shall provide any electrical cables or components needed for controlling the raising and lowering function of the TMA.

### IN CAB CONTROLS

A locking device is required for securing the TMA unit in place for transport in the vertical position (traveling or non-protective mode) and must be capable of being controlled from inside the cab of the TMA support vehicle. The TMA shall have the capability of being raised from the horizontal position (protective mode) to the vertical position (traveling or non-protective mode) and vice versa from the cab without the need to manually release or set any locking device. The TMA manufacturer shall supply any in cab remote control locking devices that are separate from the hydraulic controls of the MoDOT vehicle of choice as part of the bid. Any remote control locking device must be easily installed and removable such that the TMA can be used on different MoDOT vehicles. Vendor can quote an option to delete any hard-wire controls and substitute wireless systems in their tabulation of parts with pricing.

### COMBINATION TMA WITH FLASHING ARROW PANEL (FAP)

MoDOT routinely bids and contracts for FAP. Some TMA vendors provide TMA systems which incorporate FAPs. Vendors can provide quotes for TMA / FAP combinations. Any proposed FAP should be quoted in the parts lists with detailed information. The FAP will be considered and approved under current FAP specifications.

## FINISH

### EXTERIOR

Exterior steel surfaces shall be galvanized or finished with a corrosion resistant primer and finish paint coat (either black or chrome yellow). Exterior aluminum surfaces shall be finished with chrome yellow paint.

### SPECIAL MARKINGS

The rear face of the attenuator device, when in the horizontal or operating position (protective mode), shall be marked with red and white retroreflective sheeting. The marking shall form a checkerboard pattern consisting of nominal 12" by 12" red squares and 12" by 12" white squares spaced symmetrically starting from the top center. Bids offering other than 12" by 12" squares must be approved prior to award. MoDOT reserves the right to reject any bids offering something other than 12" by 12" squares.

The rear face of the attenuator device, when in the vertical position (traveling mode or non-protective mode), shall NOT be marked with yellow or black sheeting. The TMA shall be marked with red and white DOT conspicuity tape to simulate the looks of a standard van body trailer when traveling.

### **Trailer Mounted Attenuator (TrMA) General Specifications**

All Trailer Mounted Attenuators, hereinafter referred to as TrMA's, shall:

1. Be a model that has been successfully crash tested and certified in accordance with National Cooperative Highway Research Project (NCHRP) 350 Test Level 3 requirement with compatible support vehicle attachment installation as approved by the engineer.
2. Be a model that has been approved by the Federal Highway Administration for meeting NCHRP 350 Test Level 3 crashworthiness.
3. Be a model that has been reviewed and approved by MoDOT.
4. Be a model that complies with MoDOT's specifications as follows.

### **COMPONENTS OF TrMA SYSTEM**

The TrMA shall consist of the following basic components:

1. TrMA trailer assembly on which the attenuating device is supported and transported by the host vehicle.
2. Attenuating device (that component which is sacrificed by the impacting vehicle and is not reusable after impact).

### **DESCRIPTION OF TrMA SUPPORT VEHICLE**

MoDOT has the need for TrMAs to be installed on single and tandem axle trucks. The single axle trucks have 28,000 to 34,000 GVW. The tandem axle trucks have a 42,000 to 62,000 GVW ratings. MoDOT has special applications, such as striping nurse trucks, where TrMAs are needed for trucks, which may start the day at 66,000 lbs and end the day at about 24,000 lbs. MoDOT will select the best model to best meet our needs for routine and special operations with consideration of each models recommended capabilities. Vendors shall provide their recommended gross vehicle operating weight range for every model. MoDOT will consider these operating ranges to meet special needs.

Vendor shall provide a copy of the FHWA approval letter and supporting literature regarding the FHWA approval for each model of TrMA.

### **PINTLE HITCH**

Requirements for the pintle hitch eye are as follows:

Maximum x-section: 1 5/8"

Minimum eye opening: 3"

Minimum weight rating: 16,000 lb.

#### **MOUNTING SIMPLICITY**

The TrMA must have the capability to be attached to or removed from the support vehicle without the aid of additional transfer or lifting equipment and be able to be moved on its own support system. Wheel jacks on the attenuator shall be heavy duty double wheel with the capability to swivel and retract. The jacks shall not interfere with the operation of the unit, nor cause the unit to be illegal in width. If the wheel jacks are intended to be removable, they shall be quick connect/disconnect. If the wheel jacks are intended to be retractable, they must retract in a manner such that the bottom of the wheel on the jack does not extend below the bottom of the TrMA.

#### **ELECTRICAL/LIGHTING SYSTEM**

Electrical power for the stop, turn and tail lights on the TrMA shall be via a 7-pin male connector (SAE J560 Standard, most recent revision) on the TrMA to fit a 7-pin female connector on the rear of the support vehicle. The power requirements of the TrMA shall be compatible with the 12-volt electrical system of the TrMA support vehicle. Each TrMA shall be equipped with a four lamp stop, turn and tail lighting system and a standard three lamp identification light bar system. Turn signal lights on the TrMA shall operate independently of the brake lights. All wiring terminal connections shall be crimped, soldered, heat shrink and with weatherproof connectors.

#### **MAXIMUM DIMENSIONS**

The overall width of the TrMA assembly shall not exceed eight (8) feet (Legal width). The overall height shall not exceed thirteen (13) feet six (6) inches (Legal height).

Wheels: 15-inch (375 mm) steel, safety rim, 5 lug bolts.

Tires: 15-inch (375 mm), load range C, tubeless, radial highway tread (ST205/75R15 minimum.)

Spare (Tire and Wheel): Must include spare tire with wheel and mounting bracket.

Fenders: 16 gauge steel, inside closed in above deck, full wheel coverage.

#### **COMBINATION TrMA WITH FLASHING ARROW PANEL (FAP)**

MoDOT routinely bids and contracts for FAPs. Some TrMA vendors provide TMA systems which incorporate FAPs. Vendors can provide quotes for TrMA / FAP combinations. Any proposed FAP should be quoted in the parts lists with detailed information. The FAP will be considered and approved under current FAP specifications.

#### **EMERGENCY ALERT LIGHTS**

The PAR36 modules are weatherproof LED based warning light modules that contain state-of-the-art high intensity LEDs.

PAR36 modules are manufactured for an operating voltage of 10-16 volt D.C., Reverse Polarity Protected. Average flashing current draw for a white PAR36 module is 0.4 Amps.

Each PAR36 unit is terminated with a 6" long 4-wire cable harness.

<u><b>COLOR</b></u>	<u><b>FUNCTION</b></u>	<u><b>CONNECT TO</b></u>
Red	Power	+VDC
Black	Ground	Chassis Ground
Blue	Pattern Switching	Chassis Ground to Activate

Yellow	Synchronization	See Synchronization Section
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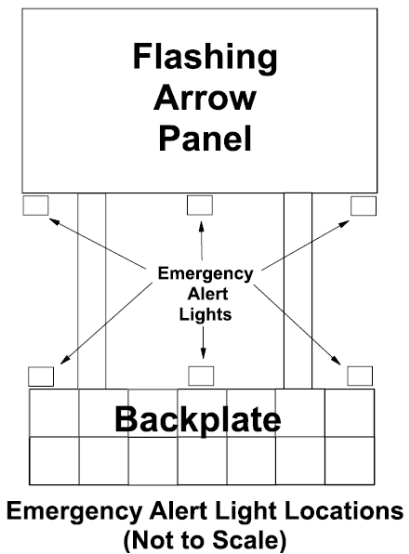
### **Setting the Flash Pattern**

Flash pattern shall be set as pattern no. 3 below.

<b>TABLE 1</b>		
<b>PATTERN NO.</b>	<b>PATTERN</b>	<b>SYNCHRONIZE</b>
1	SINGLE FLASH 75FPM PHASE 1 T13	YES
2	SINGLE FLASH 75FPM PHASE 2 T13	YES
3	SINGLE FLASH 120FPM PHASE 1 ECE R65	YES
4	SINGLE FLASH 120FPM PHASE 2 ECE R65	YES
5	SINGLE FLASH 375FPM PHASE 1	YES
6	SINGLE FLASH 375FPM PHASE 2	YES
7	DOUBLE FLASH 75FPM PHASE 1	YES
8	DOUBLE FLASH 75FPM PHASE 2	YES
9	DOUBLE FLASH 130FPM PHASE 1 SIM 1	YES
10	DOUBLE FLASH 130FPM PHASE 2 SIM 2	YES
11	TRIPLE FLASH 75FPM PHASE 1	YES
12	TRIPLE FLASH 75FPM PHASE 2	YES
13	QUAD FLASH 75FPM PHASE 1	YES
14	QUAD FLASH 75FPM PHASE 2	YES
15	QUAD FLASH 150FPM PHASE 1	YES
16	QUAD FLASH 150FPM PHASE 2	YES
17	FIVE FLASH 150FPM PHASE 1	YES
18	FIVE FLASH 150 FPM PHASE 2	YES
19	QUAD FLASH 75FPM NFPA	NO
20	SINGLE FLASH 75FPM CAT13	NO
21	DOUBLE FLASH 75FPM CAT13	NO
22	MODUFLASH SIM.	NO
23	ACTION FLASH	NO
24	AUTORUN (RANDOM)	NO
25	STEADY BURN	NO
26	OFF	NO

### **Mounting the Emergency Alert Lights**

6 PAR36 lights shall face the rear and shall be mounted by bidder as shown below in 2 rows of 3. The center lights are located at mid-point of flashing arrow panel and back plate. The other lights are located on the outside end of the flashing arrow panel and back plate.



### Connecting the Power

All six PAR36 power (RED) wire should be wired together and then wired to the main 7-pin male trailer connector. All wiring shall be secured or fasten to prevent snagging.

### FINISH

#### EXTERIOR

Exterior steel surfaces shall be galvanized or finished with a corrosion resistant primer and finish paint coat (either black or chrome yellow). Exterior aluminum surfaces shall be finished with chrome yellow paint.

#### SPECIAL MARKINGS

The rear face of the attenuator device, when in the operating position (protective mode), shall be marked with red and white retroreflective sheeting. The marking shall form a checkerboard pattern consisting of nominal 12" by 12" red squares and 12" by 12" white squares spaced symmetrically starting from the top center. Bids offering other than 12" by 12" squares must be approved prior to award. MoDOT reserves the right to reject any bids offering something other than 12" by 12" squares.

#### OWNER'S MANUAL

The successful bidder shall furnish manuals as specified in RFB.



## TRAILER MOUNTED SOLAR POWERED FLASHING ARROW PANELS MGS-06-06A

**1.0 DESCRIPTION.** All trailer mounted solar powered flashing arrow panels, hereinafter referred to as a FAP, shall be designed and manufactured in accordance with this specification.

**2.0 MATERIALS.** The FAP shall consist of an arrow panel, rotating mechanism, control switches and circuitry, a control box housing electronic components, and self-contained solar/battery power supply, as specified, all mounted on a towable trailer. Each unit shall be fully assembled when delivered.

### **2.1 FAP Panel Assembly.**

1. The FAP (housing) shall be aluminum and contain a minimum of 25 LED (Light Emitting Diode) lamps. Lamps shall be energized from control switches located in a lockable weatherproof box made of durable corrosion resistant metal material located in the arrow panel support frame.
2. A nominal 5 3/4-inch (140 mm), 360 degree tunnel visor with full-attachment flange shall be provided for each lamp. Visors shall be attached to the panel with stainless steel machine screws. Visors shall be removable without removing the screws. A nominal 0.5 inch (12 mm), butyl rubber or neoprene gasket shall be provided between each lamp and the panel face, to absorb vibration and prevent intrusion of moisture. The panel or lamp holder shall be notched to match a projection on the lamp to ensure proper lamp alignment. All lamps shall be replaceable from the front of the panel.
3. A lamp of the same type used on the panel face shall be provided on the back side of the panel and be continuously energized or flashed when the FAP is operating. A visor is not required on this lamp. It shall be located in the uppermost corner of the panel on the driver's side.
4. Lamps shall be PAR-46 yellow, 5 3/4 inch (140 mm) dia., LED lamps specifically designed for solar applications. Each lamp shall have an optical lens and contain enough light emitting diodes to meet the existing MoDOT specifications for visibility and legibility performance standards as stated later in these specifications.
5. Overall size of the FAP shall be a nominal 4 feet (1200 mm) by 8 feet (2400mm).
6. Panel mounting height shall be 7 to 9 feet (2100 to 2700 mm) from the roadway surface to the lowest point on the panel. The bottom edge of the panel shall be relatively level when in use.
7. The FAP (housing) shall consist of a nominal 3-inch x 1 inch x 1/8 inch (75 mm x 25 mm x 3 mm) welded aluminum channel with a 1/16 inch (1.5 mm) thick aluminum sheet attached to the front and back. The front and back surfaces of the panel shall be painted non-reflective flat black. All wiring inside the FAP shall be corrosion resistant wiring and shall be attached to the panel approximately every 8 inches (200 mm). All panels shall have an access door for ease of access to terminal strips/wiring connections/diodes if equipped. Door shall be located at the rear of the FAP. Company names or logos shall not be placed on the FAP.

## **2.2 Control and Wiring.**

1. A trailer mounted control will be considered the standard control. An optional wireless remote control, if available, should perform the same functions as the trailer mounted control.
2. The control switches shall provide MUTCD Sequential Arrow (Merge Right or Left), Flashing Double Arrow and Alternating Diamond Caution.
3. The control shall include an on/off switch, a dim/bright selector switch, an operation mode selector switch, and a photoelectric cell. All electronic components shall be solid state and electrically protected by fuses or circuit breakers. All cables and control wiring shall enter the control cabinet from either the back or the bottom through salt-resistant, weatherproof connectors. No external or spliced wire connections will be accepted outside of the control cabinet.
4. The optional wireless remote control unit, if available, shall be FCC approved. The wireless modules should derive power from the controller and remote respectively. Remote wireless FAP and remote shall have a permanently affixed unique I.D. label or plaque.
5. The flashing rate of the lamps shall not be less than 25 or greater than 40 flashes per minute. Lamp "ontime" shall be at least 50 percent.
6. Control circuitry shall provide dimming of all lamps to prevent blinding during night operation. Dimming shall be by manual and automatic controls, capable of at least 50 percent from full brilliance. The photoelectric cell shall automatically reduce the flashing arrow light intensity as ambient light reduces.
7. A readily accessible cartridge fuse or circuit breaker shall be provided in the circuit between the power supply and FAP control. The fuse or breaker shall be rated to handle the maximum lamp load of all lamps. The fuse or breaker shall be located in the control cabinet.

## **2.3 Power Supply.**

1. Solar Panels: Wattage of the solar panels shall be adequate to fully charge batteries, and will contain a remote battery charger back-up as described below. Solar panels shall be mounted above top of FAP with a minimum 4 degree pitch from the horizontal position to encourage shedding of dirt and rainwater.
2. Battery Charger: The battery charger with charge indicator shall be included and shall be mounted at the base of the frame of the FAP support, inside a lockable, weatherproof, battery box. The battery charger shall have the capability to charge the battery bank within a 48 to 72 hour time period from a 120 VAC utility power source..
3. Batteries: Batteries shall be the A.G.M. type (Absorb Glass Mat), class GC2, rated at no less than 200 amp hours per battery when fully charged. The quantity of batteries shall provide enough power to run the unit at full load for 30 consecutive days on battery power only. Solar charging shall be disabled during this 30 day period.
4. Battery Box: A lockable, weatherproof, battery box shall be centered over the trailer axle, made of minimum 14-gauge steel, with louvered side panels for cross-flow ventilation and with bottom and sides coated with acid-resistant protector.

5. Voltage Regulator: The voltage regulator shall be solid-state micro-processor-based, utilizing constant positive drive voltage and pulse with modulation to optimize battery charging; measuring battery voltage and adjusting current from the solar panels so the batteries are not overcharged, and also preventing overcharging of batteries by the solar panels when the sign is turned off. An automatic disconnect device shall be included to protect the entire system in case of low voltage.
6. Controller: A solid-state, LED optimized, controller shall be utilized to minimize wattage consumption and maximize battery life. Control circuitry shall provide a negative ground to each lamp at all times. Frame-ground circuitry to the lamps will not be permitted. Individual ground circuits to each lamp shall be provided. Positive power shall be supplied to each lamp through individual circuits from solid-state load switches in the control cabinet. The controller cabinet shall be assembled in a manner to allow easy access to internal control circuitry, such as with machine screws for service and repair purposes. Continuous, positive 12-volts to the lamp will not be permitted. The positive power to each lamp shall be reduced to zero voltage by the solid state load switches. It shall have reverse-polarity and short-circuit protection. The voltage regulator and controller shall be in a lockable, weatherproof, box located on the frame of the FAP support.

#### **2.4 Trailer.**

1. Welding: The trailer welding shall be in accordance with American Welding Society standards.
2. Dimensions: Minimum trailer dimensions shall be length 100 inches (2500 mm) and width 70 inches (1800 mm) (fender to fender).
3. Frame: Structural steel tubing, (minimum square tubing 2 1/2 inch x 2 1/2 inch x 11-gauge (62.5 mm x 62.5 x 11-gauge) wall thickness or minimum 2 inch (50 mm) square tubing x 1/8 inch (3 mm) wall thickness) minimum 3 cross braces (with tie-down loops on front corners.)
4. Axle: Single, minimum 2,000-pound (900-kg) capacity, tubular, with 5-hole, 4.5 inch (110 mm) B.C. circle pattern on idler hub.
5. Wheels: 15-inch (375 mm) steel, safety rim, 5 lug bolts.
6. Tires: 15-inch (375 mm), load range C, tubeless, radial highway tread (ST205/75R15 minimum.)
7. Springs: Minimum 3-leaf, double eye, minimum 1,200-pound (540-kg) capacity for each spring or adequate torsion type axle.
8. Tongue: 3-inch x 3-inch x 3/16 inch (75 mm x 75 mm x 4.8 mm) steel tubing (removable for shipping and to prevent theft.). Tongue weight approximately 10-15 percent of gross weight. Minimum 4-foot (1200 mm) hitch-to-trailer clearance.
9. Deck: 12 sq. ft. (3.6 sq. m) minimum, 10 gauge, smooth plate or open deck.
10. Fenders: 16 gauge steel, inside closed in above deck, round, full wheel coverage.



11. Safety Chain: Two, 5/16 inch x 34-inch (8 mm x 860 mm) long plated steel chains connected to a loop that is welded to the tongue. Chain shall have yield strength equal to weight of trailer and payload, or greater. Chain loop shall have yield strength equal to chain, or greater.
12. Screw Jack: Tongue mounted, 2,000-pound (900-kg) capacity, steel base 4 inch x 4 inch square foot (100 x 100 sq. mm), minimum size and capacity.
13. Leveling Legs: Adjustable on 1" increments with foot pads (4 inch x 4inch minimum), mounted on four corners of frame, perforated 1 ¾ inch (40 mm) square tube x 12-gauge wall locked in place by 3/8 inch (9.5 mm) diameter snapper pins, secured to trailer frame by wire cable or chain.
14. Hitch: Easily removable combination, 2 inch (50 mm) diameter ball coupler and a 3 inch (75 mm) inside diameter, flat pintle ring, adjustable 24-inch (600 mm) to 36-inch (900 mm), in 2-inch (50 mm) increments.
15. Paint: Entire trailer - one coat primer, one coat high-visibility, Safety Orange Paint similar to Federal Standard 595B #12243, including all surfaces under deck and on underside of fenders. Powder coat of the same color is acceptable.
16. Lights: LED and DOT Approved 12-volt, two tail/stop/turn signal; side, rear and tongue reflectors. Tail lights shall have metal guard protective assemblies. Wires shall be identified as to function.

**2.5 Performance.** Any display mode must be visible on a sunny day for a distance of one mile. The FAP must be able to operate for 30 continuous days in the flashing double arrow mode during day/night light conditions with the solar charging system disconnected. A device shall be provided to indicate the remaining charge on the batteries. The FAP support frame shall contain a device to align the FAP to oncoming traffic and to adjust the FAP so its bottom edge is relatively level when in use. The panel lamp must be visible during the "on time" at an angle of 15 degrees minimum to both left and right center and 4 degrees minimum both up and down of center.

**2.6 Owner's Manual.** The successful bidder shall furnish manuals as specified in RFB.

**3.0 WARRANTY.** New units delivered to the Missouri Department of Transportation must be covered by the manufacturer's standard warranty for a minimum of one year, which includes on-site repair (parts, labor, and travel), at no expense to MoDOT.

**3.1** All units manufactured shall be exactly the same as the units tested.

**3.2** All units shall meet or exceed the specifications for FAP boards as listed in Part 6F.61 of the current Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD).



## TRUCK MOUNTED SOLAR POWERED FLASHING ARROW PANELS MGS-06-08A

**1.0 DESCRIPTION.** All truck mounted solar powered flashing arrow panels, hereinafter referred to as a FAP, shall be designed and manufactured in accordance with this specification.

**2.0 MATERIALS.** The FAP shall consist of an arrow panel, mounting frame and rotating mechanism, remote control switches and circuitry, and a lockable control cabinet housing electronic components in a self-contained solar/battery power supply. Each unit shall be fully assembled when delivered.

### **2.1 FAP Panel Assembly.**

1. The FAP shall be aluminum and contain a minimum of 25 LED lamps. Lamps shall be energized from a control cabinet mounted inside the battery compartment and controlled by the remote control switches located inside the truck cab.
2. A nominal 5  $\frac{3}{4}$  inch (140 mm), 360 degree tunnel visor with full attachment flange shall be provided for each lamp. Visors shall be attached to the panel with stainless steel machine screws. Visors shall be removable without removing the screws. A nominal 0.5 inch (12 mm), butyl rubber or neoprene gasket shall be provided between each lamp and the panel face, to absorb vibration and prevent intrusion of moisture. The panel or lamp holder shall be notched to match a projection the lamp to ensure proper lamp alignment. All lamps shall be replaceable from the front of the panel.
3. A lamp of the same type used of the panel face shall be provided on the back side of the panel and be continuously energized or flashed when the FAP is operating. A visor is not required on this lamp but recommended. It shall be located in the uppermost corner of the panel on the driver's side.
4. LED lamps shall be PAR-46, yellow, 5  $\frac{3}{4}$  inch (140 mm) dia., LED lamps, specifically designed for solar applications. Each lamp shall have an optical lens and contain enough light emitting diodes to meet the existing MoDOT specifications for the visibility and legibility performance standards as stated later in these specifications.
5. Overall size of the FAP shall be a nominal 3 feet (900 mm) by 6 feet (1800 mm).
6. Panel mounting height shall be a nominal 4  $\frac{1}{2}$  feet from the bottom of the support frame to the lowest point on the panel.
7. The FAP (housing) shall consist of a nominal 3 inch x 1 inch x  $\frac{1}{8}$  inch (75 mm x 25 mm x 3 mm) welded aluminum channel with a  $\frac{1}{16}$  inch (1.5 mm) thick aluminum sheet attached to the front and back. The front and back surfaces of the panel shall be painted non-reflective flat black. All wiring inside the FAP shall be corrosion resistant wiring and shall be attached to the panel approximately every 8 inches (200 mm). All panels shall have an access door for ease of access to terminal strips/wiring connections/diodes if equipped. Door shall be located at the rear of the FAP. Company names or logos shall not be placed on the FAP.

### **2.2 Control and Wiring.**

1. A remote cab control will be considered the standard control. An optional wireless remote control, if available, should perform the same functions as the remote cab control.

2. The remote cab control switches shall provide MUTCD Sequential Arrow (Merge Right or Left), Flashing Double Arrow and Alternating Diamond Caution.
3. The remote cab control switches shall include an on/off switch, a dim/bright selector switch, an operation mode selector switch, an LED power-on lamp, and be equipped for top of dash mounting. The control shall be provided with at least 30 feet (9 meters) of multi-conductor, salt resistant, weather proof cable and a NEMA 4 surface base cover connector plug to connect the NEMA 4 side entry hood connector mounted approximately 4 feet (1200 mm) from the base of the frame and controller. The remote cab control shall be assembled in a manner to allow easy access to internal circuitry and switches for service and repair, such as machine screws. All electronic components shall be solid state and electrically protected by fuses or circuit breakers.
4. (4) The optional wireless remote control unit, if available, shall be FCC approved. The wireless modules should derive power from the controller and remote respectively. Remote wireless FAP and remote shall have a permanently affixed unique I.D. label or plaque.
5. The flashing rate of the lamps shall not be less than 25 or greater than 40 flashes per minute. Lamp "on-time" shall be at least 50 percent.
6. Control circuitry shall provide dimming of all lamps to prevent blinding during night operation. Dimming shall be by manual and automatic controls, capable of at least 50 percent from full brilliance. The photoelectric cell shall automatically reduce the flashing arrow light intensity as ambient light reduces.
7. A readily accessible cartridge fuse or circuit breaker shall be provided at the power supply end of the circuit between the power supply and the controller mounted inside the battery box. The fuse or breaker shall be rated to handle the maximum lamp load of all lamps. An additional fuse or breaker shall be located of the controller cabinet, protecting the circuit supplying the remote cab control.

### **2.3 Power Supply.**

1. Solar Panels: Wattage of the solar panels shall be adequate to fully charge batteries, and will contain a remote battery charger back-up as described below. Solar panels shall be mounted above top of FAP with a minimum 4 degree pitch from the horizontal position to encourage shedding of dirt and rainwater.
2. Battery Charger: The battery charger with charge indicator shall be included and shall be mounted at the base of the frame of the FAP support, inside a lockable, weatherproof, battery box. The battery charger shall have the capability to charge the battery bank within a 48 to 72 hour time period from a 120 VAC utility power source..
3. Batteries: Batteries shall be the A.G.M. type (Absorb Glass Mat), class GC2, rated at no less than 200 amp hours per battery when fully charged. The quantity of batteries shall provide enough power to run the unit at full load for 30 consecutive days on battery power only. Solar charging shall be disabled during this 30 day period.

4. **Battery Box:** A fully enclosed (sides, top, bottom) lockable, weatherproof box, mounted at the base of the frame of the FAP support, shall be made of minimum 14-guage steel, with louvered side panels for cross-flow ventilation and with the sides and bottom coated with acid-resistant protector. The battery box shall be large enough to sufficiently house and service the controller, batteries and charger. The lid of the battery box shall be hinged and include a stabilizer rod to allow ease of maintenance and repair of batteries, charger and or photoelectric control.
5. **Voltage Regulator:** The voltage regulator shall be solid-state, micro-processor-based, utilizing constant positive voltage and pulse with modulation to optimize battery charging, measuring battery voltage and adjusting current from the solar panels so the batteries are not overcharged and also prevent overcharging of the batteries by the solar panels when the panel is turned off. An automatic disconnect device shall be included to protect the entire system in case of low voltage.
6. **Controller:** A solid-state, LED optimized, controller shall be utilized to minimize wattage consumption and maximize battery life. The control circuitry shall provide a negative ground to each lamp at all times. Frame-ground circuitry to the lamps will not be permitted. Individual ground circuits to each lamp shall be provided. Positive power shall be supplied to each lamp through individual circuits from solid-state load switches in the control cabinet. The controller cabinet shall be assembled in a manner to allow easy access to the internal control circuitry, such as with machine screws, for service and repair purposes. The controller shall be provided with a 4 foot (1200 mm) long weather and salt-resistant, multi-conductor cable and side entry hood connector to provide a means of connection from the remote cab control. Continuous, positive 12-volts to the lamps will not be permitted. The positive power to each lamp shall be reduced to zero voltage by the solid-state load switches. It shall have reverse-polarity and short-circuit protection. The voltage regulator and controller shall be in a lockable, weatherproof, battery box mounted at the base of the frame.
7. **Disconnect and Enclosures:** Disconnect plug and receptacle shall be determined by the current, voltage, and number of contacts required for proper operation. Connectors shall have screw terminations and accommodate a wire size of up to #12AWG. The male connector shall be enclosed in a NEMA 4 rated surface base enclosure and cover. The female connector shall be enclosed in a NEMA 4 side-entry hood enclosure. Multi-conductor cable shall enter the bottom of the enclosures through a waterproof, flame-resistant, salt and corrosion resistant cable connector with a sealing nut and internal ratchet containing a neoprene cable gland.

## **2.4 Framework.**

1. The FAP shall be supported on a four vertical post framework consisting of welded steel tubing in accordance with American Welding Society standards. All open ends of tubing shall be capped and welded shut. The panel shall be rotatable from a horizontal to a vertical position by means of an electrically operated actuator. When in the horizontal position, the panel shall rest on a rigid frame support, relieving the load from the rotating device. Each panel shall contain a tie down anchor point on each side, (left, right) of the frame to accommodate a 4-6 inch (100-150 mm) wide strap to anchor to the truck. Angle and cross bracing of the vertical supports shall be provided at the top and bottom of the supports to ensure a rigid frame. See drawing on Attachment 1. Each FAP shall be equipped with two forklift tubes for ease of installation as shown in Attachment 1.

2. The support frame shall be painted one coat of primer and one coat high-visibility, Safety Orange Paint similar to Federal Standard 595B #12243. Powder coat of the same color is acceptable.

**2.5 Performance.** Any display mode must be visible on a sunny day for a distance of one mile. The FAP must be able to operate for 30 continuous days in the flashing double arrow mode during day/night light conditions with the solar charging system disconnected. A device shall be provided to indicate the remaining charge on the batteries. The FAP support frame shall contain a device to align the FAP to oncoming traffic and to adjust the FAP so its bottom edge is relatively level when in use. The panel lamp must be visible during the "on time" at an angle of 15 degrees minimum to both left and right center and 4 degrees minimum both up and down of center.

**2.6 Owner's Manual.** The successful bidder shall furnish manuals as specified in RFB.

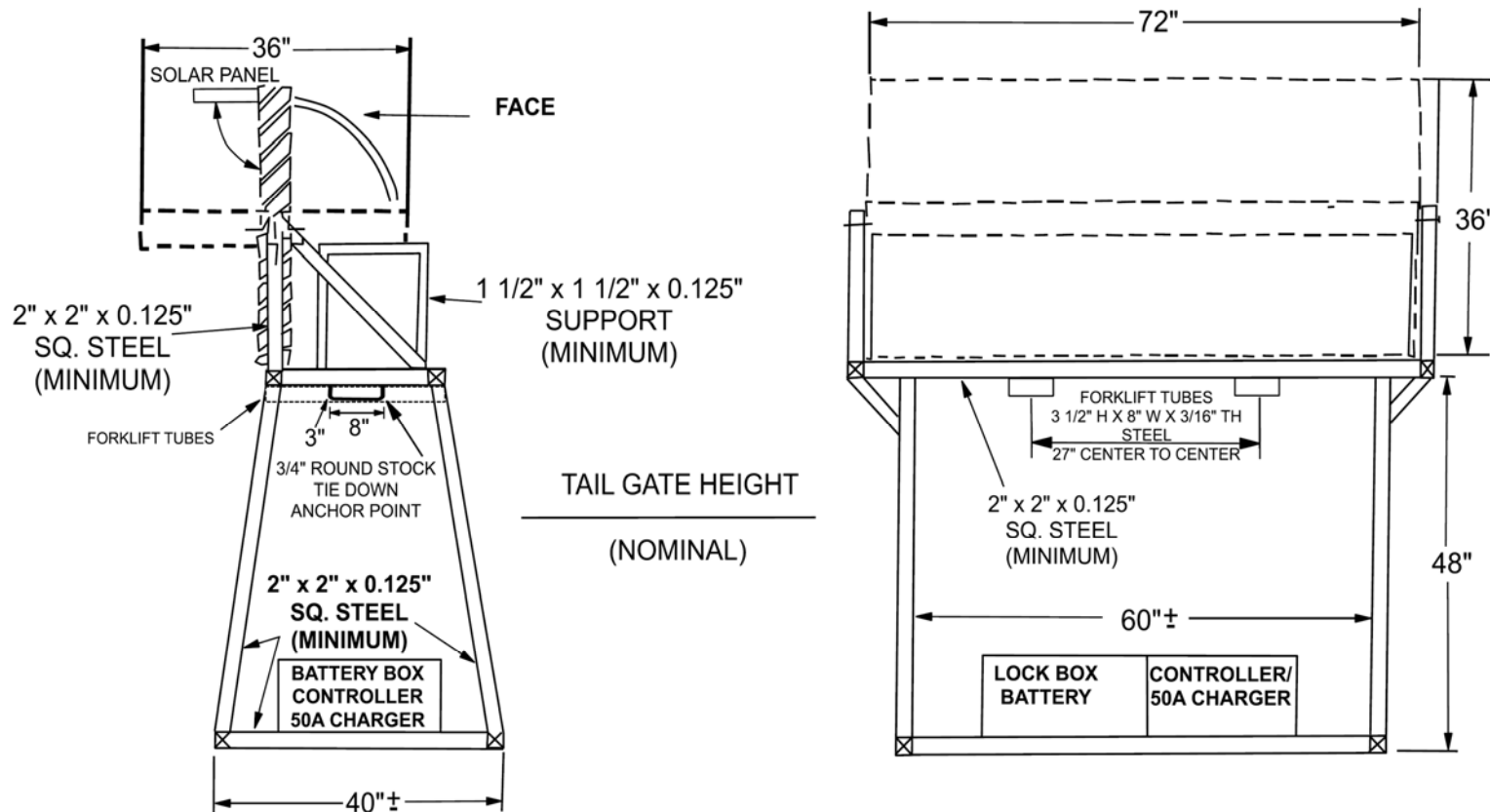
**3.0 WARRANTY.** New units delivered to the Missouri Department of Transportation must be covered by the manufacturer's standard warranty for a minimum of one year, which includes on-site repair (parts, labor, and travel), at no expense to MoDOT.

**3.1** All units manufactured shall be exactly the same as the units tested.

**3.2** All units shall meet or exceed the specifications for FAP boards as listed in Part 6F.61 of the current Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD).

## TRUCK MOUNTED SOLAR POWERED FLASHING ARROW PANEL SUPPORT FRAME

### ATTACHMENT 1

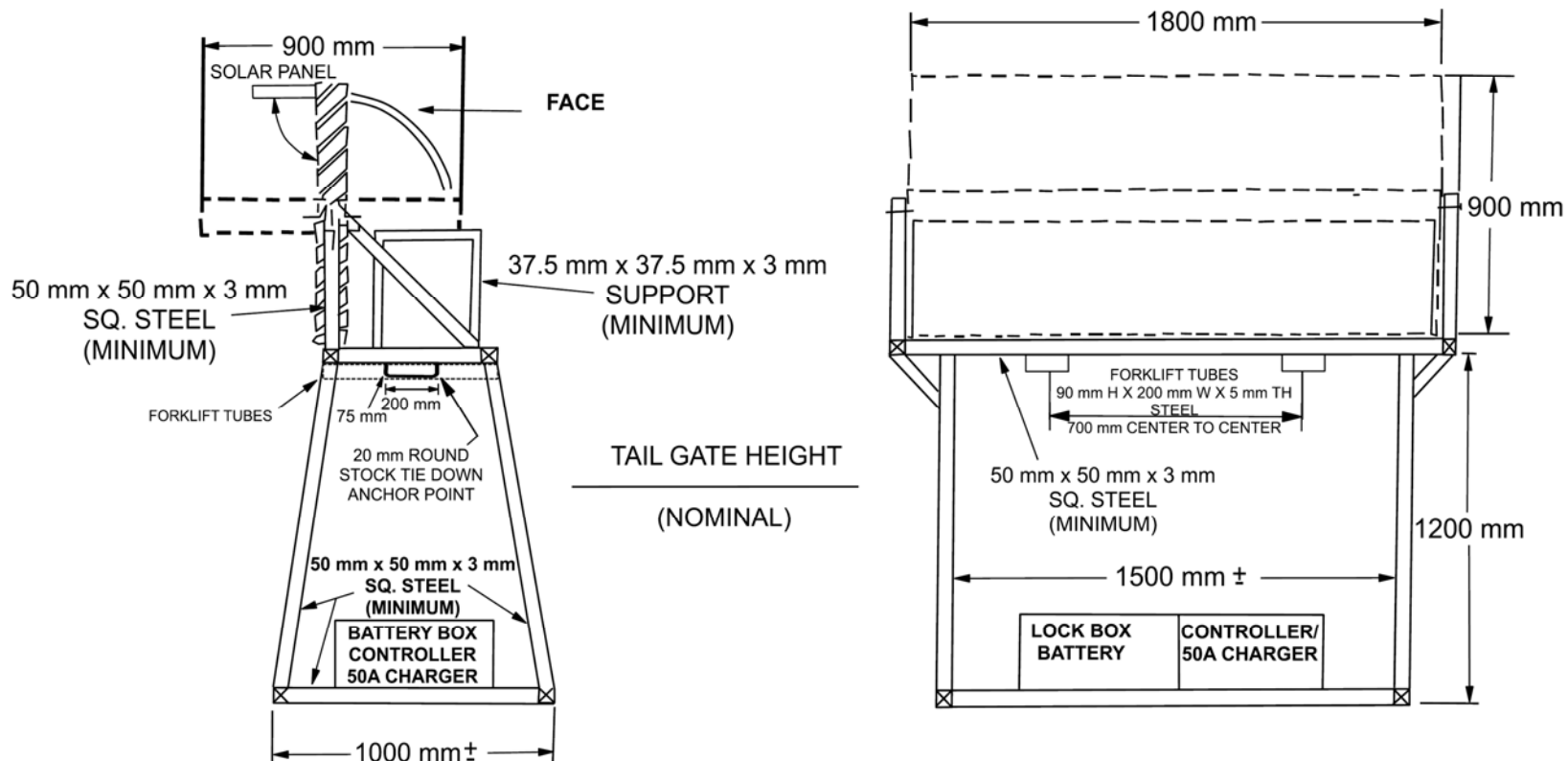


#### NOTE:

THE SUPPORT FRAME MAY VARY FROM THIS CONFIGURATION BUT THE OVERALL DIMENSIONS SHOULD BE THE SAME.

## TRUCK MOUNTED SOLAR POWERED FLASHING ARROW PANEL SUPPORT FRAME (METRIC)

ATTACHMENT 1



NOTE:

THE SUPPORT FRAME MAY VARY FROM THIS  
CONFIGURATION BUT THE OVERALL DIMENSIONS  
SHOULD BE THE SAME.