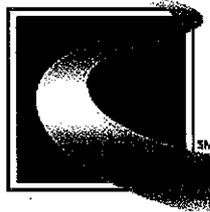


***MARYLAND TRANSPORTATION AUTHORITY***  
***Baltimore, Maryland***

***Invitation for Bids***

**John F. Kennedy Memorial Highway  
Thomas J. Hatem Memorial Bridge**



**Maryland  
Transportation  
Authority**

**CONTRACT NO. MA 679-000-002**

**Upgrade and Replace Existing Signing – Northern Region**

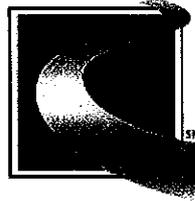
**Baltimore County, Maryland  
Harford County, Maryland  
Cecil County Maryland  
New Castle County, Delaware**

**March 2010**

**MARYLAND TRANSPORTATION AUTHORITY**  
**Baltimore, Maryland**

***Invitation for Bids***

John F. Kennedy Memorial Highway  
Thomas J. Hatem Memorial Bridge



**Maryland  
Transportation  
Authority**

Contract No. MA 679-000-002

**Upgrade and Replace Existing Signing – Northern  
Region**

**Baltimore County, Maryland  
Harford County, Maryland  
Cecil County Maryland  
New Castle County, Delaware**

**March 2010**

**NOTICE TO BIDDERS**

A “Pre-Bidding Session” for the purpose of answering or obtaining answers to questions of parties interested in constructing the work relative to Right-of-Way, Utilities, Design, and Construction Details will be conducted at **9:30 am** on **April 7, 2010**, in the Conference Room, at the Maryland Transportation Authority, 303 Authority Drive, 1st Floor, Baltimore, Maryland 21222. While attendance at the Pre-Bid conference is not mandatory, this is the offeror’s opportunity to raise questions and/or issues of concern regarding the project.



**TABLE OF CONTENTS**

	<u>Page No.</u>
Invitation for Bids .....	i
Table of Contents .....	ii-iv
<b>Contract Provisions</b>	
Check list prior to submitting bids.....	v-vi
Important information regarding MBE utilization and bidding Requirements .....	vii-x
Notice to Bidders/Offerors about eMaryland Marketplace .....	xi
National Cooperative Highway Research Program .....	xii-xiii
Apprenticeship Training Fund .....	xiv-xix
Special Provisions .....	1-7
Revisions to General Provisions .....	8-15
Revisions to Terms and Conditions .....	16-20
<b>Revisions to Technical Requirements:</b>	
Section 103      Engineers Office.....	21
Section 104.00    Maintenance of Traffic (Traffic Control Plan).....	22-26
Section 104.11    Maintenance of Traffic (Temporary Pavement Markings) .....	27-28
Section 104.14    Cones for Maintenance of Traffic .....	29
Section 113      Digital Camera .....	30-31
Section 308.01    Erosion and Sediment Control .....	32-35
Section 800-1     Catalog Cuts and Working Drawings.....	36-40
Section 800-2     Field Equipment Cabinets .....	41-48
Section 800-3     Square Perforated Tubular Steel Posts .....	49-50
Section 800-4     Sign Installation Date Stickers .....	51
Section 800-5     Installation of Dynamic Message Sign and Controllers .....	52-56
Section 800-6     Utility Connections and Utility Stakeout .....	57-58



	<u>Page No.</u>
Section 800-7	Dynamic Message Sign – ISDN Communications .....59
Section 800-8	Sign Structure Identification Number Label .....60
Section 803	Overhead Sign Structures .....61
Section 809	Trenching and Backfilling.....62-63
Section 822	Remove and Relocate Existing Signs and Sign Structures .....64
Section 830	Common Work Results for Electrical .....65
Section 832	Electrical Identification .....66
Section 902	Portland Cement Concrete and Related Products.....67-81
Section 908	Reinforcement Steel .....82
Section 950.03	Reflectorization of Signs and Channelizing Devices .....83
Section 950.06	Electrical Cable and Wire.....84
Section 950.12	Luminaries and Lamps .....85
Section 951.04	Removable Preformed Pavement Marking Material.....86-88
Wage Rates .....	89-96
Contractor Affirmative Action Program.....	97-113
Affirmative Action Requirements Utilization of Minority Business Enterprises for Straight State Contracts.....	114-119
Proposal Form.....	120
Schedule of Prices.....	121-147
Contract Time and Bonding.....	148
Buy American Steel Act .....	149-151
Exhibit to Solicitation State of Maryland - Maryland Transportation Authority Minority Business Enterprise Participation .....	152-162
Bid/Proposal Affidavit.....	163-173
Escrow Account For Retained Funds .....	174



	<u>Page No.</u>
Proposal Guaranty.....	175
Bid Guarantee .....	176-177
Bid Bond .....	178-180
Appendices Cover page .....	181
Appendix A: Memorandum of Understanding with Delaware Department of Transportation ...	A1-A12
Appendix B: Stormwater Management and Sediment & Erosion Control permit .....	B1



**NOTICE TO BIDDERS**

Please review the checklist prior to submitting your bid on this Contract.

- When submitting your completed bid, do not separate the book. Submit the whole book including all addenda acknowledgment pages.
- Make sure that all addenda letters are attached outside of the front cover of the bid book.
- If the addendum has revised the Schedule of Prices, make sure that you have included the revised pages in your bid. Your price should reflect any and all changes.
- Prices must be written numerically and in words, unless approved substitute forms are used (Refer to GP-2.06). Don't leave any items blank.
- When tabulating your final price, make sure all your calculations are correct.
- Minority Business Enterprise Attachments A and B must be completed and submitted with your bid. If either of these attachments is missing your bid is non-responsive. Attachments C and D **should not** be submitted at time of bid. **For additional information on how to complete the MBE Attachments, please see the insert named "Important Information regarding MBE Utilization and Bidding Requirements" located in the IFB.**
- The Bid/Proposal Affidavit must be completely filled out and signed by all the parties as indicated.
- If Escrow is being offered in a contract, the contractor must indicate whether or not they wish to utilize an Escrow Account for Retained Funds on the provided form.
- A bid bond must accompany all bids of One Hundred Thousand Dollars (\$100,000.00) or more. The bid bond document must be completely filled out and have an original Power of Attorney form attached.
- If the document is too large for the envelope that we have provided, you can place the document in another form of packaging that can be sealed and submitted. If the document is too large for the bid box, you should alert the receptionist.
- Make sure that your company's name, address, the contract number and the bid date appears on the front of the packaging.



Maryland  
Transportation  
Authority

CONTRACT PROVISIONS  
Contract No. MA 679-000-002

11/20/08

**2 of 2**

- When submitting bid packages via US Mail, Federal Express, DHL, UPS or any other delivery service it is your responsibility to make sure that the bid reaches the bid box before the time deadline. It may be in your best interest to send the package 24 hours in advance of the deadline. Also, when sending packages this way, make sure that the labeling specifies that it is a bid submission.



## IMPORTANT INFORMATION REGARDING MBE UTILIZATION AND BIDDING REQUIREMENTS

The Maryland Transportation Authority (the "Authority") has been forced to reject many recent bids/proposals due to bid submissions that were not in strict compliance with the stipulated MBE rules and regulations. The following checklist has been developed to highlight certain critical components of the MBE program requirements. This listing is not all-inclusive and the bidder **must** comply with all MBE rules and regulations listed throughout this entire proposal book.

Please read all of the instruction provided on Attachment A, B, C & D in its entirety before completing the forms.

Attachment A (Certified MBE Utilization and Fair Solicitation Affidavit) & Attachment B (MBE Participation Schedule) must be included with the submittal of the bid or offer. If the bidder or offeror fails to submit these forms with the bid/offer as required, the Procurement Officer **shall deem the bid non-responsive** or shall determine that the **offer is not reasonably susceptible** of being selected for award. MBE Prime Contractors must achieve the established MBE goal with other certified MBE contractors. A Prime MBE Contractor **can not** count itself as an MBE to obtain the goal.

### ATTACHMENT A

When filling out Attachment A, make sure you complete the following:

- If the Prime Contractor can achieve the established overall goal and sub goals, you must check the appropriate box.
- If after making good faith efforts, you determine you can not achieve the established overall goal or subgoals, you must request a waiver by checking the appropriate box.
- If you do not request the waiver at time of bid and you **are not** meeting the established goal(s), your bid/offer will be considered **non-responsive or not reasonably susceptible of being selected for award.**
- Attachment A must be signed and dated.



## ATTACHMENT B Part 2

When filling out Attachment B, make sure you have included the following:

- Prime Contractor's name, address and phone number.
- Project description.
- Project number/Solicitation Number.
- List the minority firm name(Column 1), certification number and MBE Classification (Column 2), Total sub contract dollar amount (Column 3) and NAICS Codes of the services to be performed or products to be supplied (Column 4)
- Clarify for each sub-contractor if it will provide services, is a supplier or will supply and install (Column 5)
- It is the Contractor's responsibility to ensure that the proposed subcontractors are certified to perform the proposed work. All Contractors are to submit an approvable MBE plan at time of bid. Approvable means, the subcontractors are certified in the applicable NAICS Codes through MDOT and can perform the proposed services for the required participation goal. Contractors pending MBE certification at time of bid are **not** eligible for participation. If you submit a firm that is not certified to perform the proposed services and your contract falls short of the established MBE goal, your firm will be considered **non-responsive or not reasonably susceptible of being selected for award.**
- Prime Contractors are strongly encouraged to check the MDOT database at [www.mbe.mdot.state.md.us](http://www.mbe.mdot.state.md.us) to see if the subcontractor is certified to perform the services and to make sure the subcontractor has not graduated from the listed NAICS codes. If you have questions after checking the data base, you may contact the Authority MBE Office at 410-537-1048 for further assistance.

If you are using a supplier, the 60% rule applies. Please refer to the MBE Manual for the description of the 60% rule.

Please provide details on how you arrived at the 60% on Attachment B (Column 5) (i.e. - \$150,000.00 X 60% = \$90,000.00).

- If you are requesting a third tier relationship, you must state that request on the Attachment B form (Column 1). Please note: Third Tier MBE/DBE subcontracting will be approved by the Authority only when



the Authority is satisfied that there is no way except by Third Tier contracting that an MBE/DBE goal can be achieved. Specifics as to why a Third Tier contracting agreement must be included.

- Attachment B must be signed and dated.
- If you are the apparent low bidder, you will receive a letter from the Authority requesting your MBE Attachment C (Outreach Efforts Compliance Statement) and Attachment D (Subcontractor Project Participation Affidavit). You will have ten (10) working days to submit the attachments to the Authority. If you requested a waiver at time of bid, all of the back up documentation that complies with COMAR 21.11.03.11, must be submitted within the ten working days with Attachments C & D.
- If the apparent low bidder fails to return the required documentation within the allotted ten (10) days, the Procurement Officer may determine that the apparent low bidder is not responsible and therefore not eligible for contract award.

### **Dual Certification Procurement Information**

Effective on October 1, 2009, Minority Business Enterprise (MBE) firms may elect to be dually certification as woman-owned businesses and as members of an ethnic or racial category. For purposes of achieving any gender or ethnic/racial MBE participation subgoals in a particular contract, an MBE firm that has dual certification may participate in the contract either as a woman-owned business or as a business owned by a member of a racial or ethnic minority group, **but not both.**

### **WARNING – PLEASE READ:**

- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with the gender category in order to be used to meet the gender subgoal.**
- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with an ethnic/racial category in order to be used to meet the ethnic/racial subgoal.**



- ◆ **A firm must be listed in the MDOT MBE/DBE Directory with both the gender and ethnic/racial categories in order for a contractor to have the option of selecting which of those categories it will use for the firm on a State contract.**
- ◆ **Contractors should designate whether the MBE firm will be used as a woman-owned business or as a business owned by a member of a racial/ethnic group before calculating the percentage of MBE participation goals and subgoals they intend to meet.**

Maryland's MBE/DBE Directory will reflect the dual certification status beginning October 1, 2009. You can access the MBE/DBE Directory at <http://mbe.mdot.state.md.us>. Firms with dual certification will now be listed as follows:

Example:

ABC Corporation, Inc.  
123 Corporate Circle  
Hanover, MD 21076  
**Female/African American**  
00-000



## **Notice to Bidders/Offerors**

### **eMaryland Marketplace**

In order to take advantage of Maryland State and Local government contracting opportunities, vendors/contractors are encouraged to register with eMaryland Marketplace. The free registration provides a means for businesses to receive e-mail notification of upcoming contracting opportunities in their specified areas of interest and expertise.

For registration requirements, visit:  
[www.eMarylandMarketplace.com](http://www.eMarylandMarketplace.com)

---



**NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT**

**NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM  
(NCHRP) REPORT 350 IMPLEMENTATION SCHEDULE FOR DEVICES  
USED IN THE MAINTENANCE OF TRAFFIC**

Except as otherwise specified in this Section, all items for the maintenance of traffic, including those listed under the following categories, shall be crashworthy in conformance with Level 3 or other Level as specified by the Engineer in conformance with the safety crash testing and performance criteria published in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features." When conformance with NCHRP Report 350 is required, the Contractor shall provide the Engineer with the manufacturers' certifications that the devices comply with the specified criteria.

Unless specifically waived by an attachment to these Contract Provisions, devices must be approved by the Office of Traffic and Safety.

**Category 1 Devices**

These devices are cones, tubular markers, flexible delineator posts, and drums, all without any accessories or attachments, which are used for channelization and delineation.

**Category 2 Devices**

These devices are Type I, II, and III barricades; portable sign supports with signs; intrusion alarms; and drums, vertical panels, and cones, all with accessories or attachments.

**Category 3 Devices**

- (a) Truck Mounted Attenuators (TMAs) and Trailer Truck Mounted Attenuators (TTMAs) .
- (b) Temporary Barrier.
  - (1) Concrete Barrier.
  - (2) Traffic Barrier W Beam and Water Filled Barrier.
  - (3) Steel/Aluminum Barrier.
- (c) Temporary End Treatments.

**Category 4 Devices**

These devices are area lighting supports, arrow panels, and portable variable message signs that are usually portable or trailer-mounted.



WORK ZONE DEVICES	IMPLEMENTATION SCHEDULE TO CONFORM TO NCHRP REPORT 350 CRITERIA
<p><b>CATEGORY 1</b> Cones, tubular markers, flexible delineator posts, and drums (all without any accessories or attachments)</p>	<p>All devices shall conform to NCHRP Report 350 criteria.</p>
<p><b>CATEGORY 2</b> Type I, II, and III barricades; portable signs supports with signs; intrusion alarms; and drums, vertical panels, and cones (all with accessories or attachments)</p>	<p>All devices shall conform to NCHRP Report 350 criteria.</p>
<p><b>CATEGORY 3</b> (a) Truck Mounted Attenuators (TMAs); Trailer Truck Mounted Attenuators (TTMAs) (b) Temporary Barriers     (1) Concrete Barrier     (2) Traffic Barrier W Beam and Water Filled Barrier (3) Steel/Aluminum Barrier (c) Temporary End Treatments</p>	<p>All devices shall conform to NCHRP Report 350 criteria.</p>
<p><b>CATEGORY 4</b> Portable trailer mounted devices including area lighting supports, arrow panels, and changeable message signs</p>	<p>The Contractor may use devices that do not conform to NCHRP Report 350 criteria, until compliance dates are established. Use of these devices shall comply with the provisions of Part 6 of the MUTCD.</p>



**CONTRACT PROVISIONS  
APPRENTICESHIP TRAINING FUND**

Effective October 1, 2009, State Law requires all contractors and subcontractors working on State prevailing wage projects with prevailing wage determinations to register (Apprenticeship Training Fund Site) with the Division of Labor and Industry Prevailing Wage Unit prior to the commencement of work and to make certain contributions toward improving and expanding apprenticeship programs in the State. In addition, registered apprenticeship programs and organizations that have registered apprenticeship programs that have been selected by contractors and subcontractors for contributions also are required to register with the Division of Labor and Industry Prevailing Wage Unit.

**Definitions.** The following terms have the meanings indicated.

**(a) Terms Defined.**

- (1) "Approved apprenticeship program" means an apprenticeship program or an organization with an apprenticeship program which has been registered with, and approved by, the Maryland Apprenticeship and Training Council or the United States Department of Labor.
- (2) "Commissioner" means the Commissioner of Labor and Industry.
- (3) "Covered craft" means a classification of workers listed in the prevailing wage determination applicable to a prevailing wage project.
- (4) "Fund" means the State Apprenticeship Training Fund.
- (5) "Monthly Certified Verification Report" means the monthly report that details contractor and subcontractor contributions for that month available on the Division of Labor and Industry's website.
- (6) "Public body" means a unit of State government as defined in § 17-201(l), State Finance and Procurement Article, Annotated Code of Maryland.
- (7) "Unit" means the Division of Labor and Industry, Prevailing Wage Unit and the public body that awarded the procurement contract.



- (8) “Yearly Certified Verification Report” means the yearly report that details contractor and subcontractor contributions for the preceding year available on the Division of Labor and Industry’s website.

**Contractor/Subcontractor Registration.** Contractors and subcontractors awarded a procurement contract on a public work contract subject to the Maryland Prevailing Wage Law shall register on the Division of Labor and Industry’s website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor) prior to the commencement of work.

**Contractor/Subcontractor Project Management.** Upon registration under Contractor/Subcontractor Registration of this Chapter, contractors and subcontractors are required to provide information to the Division of Labor and Industry on its website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor) about each public work contract including the following:

- (a) The prevailing wage project number for each prevailing wage project the contractor or subcontractor is performing work on; and
- (b) The contract value for each prevailing wage project the contractor or subcontractor is performing work on.

**Contractor/Subcontractor Notification to Subcontractors.** Contractors and subcontractors who hire subcontractors on a public work contract subject to the Maryland Prevailing Wage Law shall provide all subcontractors with written notice of the following requirements:

- (a) Subcontractors are required to register on the Division of Labor and Industry’s website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor) prior to the commencement of work;
- (b) After registration, subcontractors are required to enter certain information about each prevailing wage project on the Division of Labor and Industry’s website; and
- (c) Subcontractors performing work on a prevailing wage project valued at \$100,000 or more are required to make payments to approved apprenticeship programs or to the Fund for workers in classifications listed on the prevailing wage determination, or both.

Contractors and subcontractors shall retain a copy of the written notice required in §A of this Regulation that was provided to all subcontractors for inspection and review by the Commissioner for three years.

**Contributions to the Fund.**



- (a) A contractor or a subcontractor that makes contributions to the Fund shall do so in the amount of \$.25 per hour for each employee in each covered craft on the prevailing wage project on a monthly basis.
- (b) A contractor or a subcontractor that makes contributions to the Fund, who is performing work under a prevailing wage determination for a covered craft that includes a fringe benefit contribution that exceeds \$.25 cents, shall pay to the employee in wages the amount the fringe benefit contribution exceeds \$.25 cents.

**Contributions to Approved Apprenticeship Programs.** If a contractor or a subcontractor makes contributions to an approved apprenticeship program in an amount less than \$.25 per hour for each employee in each covered craft on the prevailing wage project, the contractor or subcontractor shall make payments to the Fund in the amount of the difference between \$.25 and its contribution on a monthly basis.

**Contractor/Subcontractor Obligations Relating to Approved Apprenticeship Program.**

- (a) Contractors and subcontractors are required to complete and to file on the Division of Labor and Industry's website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor) the Monthly Certified Verification Report which shall include the following:
  - (1) A list of the contributions to each approved apprenticeship program during the last month;
  - (2) A statement signed by the contractor or subcontractor that the information is correct and that the contractor or subcontractor has complied with the requirements of Subtitle 6, Title 17, State Finance and Procurement Article, Annotated Code of Maryland.
- (b) Contractors and subcontractors are required to submit the Monthly Certified Verification Report by the 30<sup>th</sup> calendar day of each month for the previous month.
- (c) Contractors and subcontractors are required to complete and to file on the Division of Labor and Industry's website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor) the Yearly Certified Verification Report which shall include the following:
  - (1) A summary of monthly contributions with total annual contributions; and
  - (2) A statement signed by the contractor or subcontractor that the information is correct and that the contractor or subcontractor has complied with the requirements of Subtitle 6, Title 17, State Finance and Procurement Article, Annotated Code of Maryland.



- (d) Contractors and subcontractors shall post a copy of their Yearly Certified Verification Report in a prominent and easily accessible place in the workplace near where work is performed.

**Notification to Division of Labor of Changes to Designated Approved Apprenticeship Programs or Fund.** Contractors and subcontractors shall provide the Commissioner with written notice of each approved apprenticeship program or the Fund to which it will make contributions. If a contractor or subcontractor changes their designation, it shall notify the Division of Labor and Industry 30 days prior to the change in designation.

**Approved Apprenticeship Program Obligations.** Upon notification from the Division of Labor and Industry that the approved apprenticeship program has been designated for contributions by a contractor or subcontractor, the approved apprenticeship program shall register on the Division of Labor and Industry's website at [www.dllr.state.md.us/labor](http://www.dllr.state.md.us/labor).

After registering under §A of this Regulation, an approved apprenticeship program will receive a summary of contractor and subcontractor contributions from the Division of Labor and Industry on a monthly basis and shall comply with the following:

- (a) Review and certify that the contribution amounts are correct;
- (b) Certify that all funds received are used solely for the purpose of improving or expanding apprenticeship training in the State; and
- (c) File a response within 30 days of receipt of the Division of Labor and Industry's summary.

**Enforcement Procedures.**

- (a) The Commissioner may investigate whether Subtitle 6 of Title 17 of the State Finance and Procurement Article, Annotated Code of Maryland, has been violated:
  - (1) On the Commissioner's own initiative;
  - (2) On receipt of a written complaint; or
  - (3) On referral from another State agency.



- (b) The Commissioner may require a contractor, subcontractor, or an approved apprenticeship program to produce records as part of its investigation.
- (c) The Commissioner may enter a place of business to:
  - (1) Interview individuals; or
  - (2) Review and copy records.
- (d) If after an investigation, the Commissioner determines that there is a violation of Subtitle 6, Title 17 or a regulation adopted to carry out the title, the Commissioner shall issue a citation that shall:
  - (1) Describe in detail the nature of the alleged violation;
  - (2) Cite the provision of law or regulation that is alleged to have been violated; and
  - (3) State the penalty, if any.
- (e) Within a reasonable amount of time after the issuance of the citation, the Commissioner shall send a copy of the citation to the alleged violator by certified mail with notice of the opportunity to request a hearing.
- (f) Within 15 days after the alleged violator receives the citation, the employer may submit a written request for a hearing on the citation and proposed penalty.
- (g) If a hearing is not requested within fifteen days, the citation, including any penalties, shall become a final order of the Commissioner.
- (h) If there is a request for a hearing, the Commissioner may delegate the hearing to the Office of Administrative Hearings in accordance with Title 10, Subtitle 2 of the State Government Article, Annotated Code of Maryland.
- (i) A proposed decision of an administrative law judge shall become a final order of the Commissioner unless, within 15 days of the issuance of the proposed decision:
  - (1) The Commissioner orders review of the proposed decision; and



- (2) The alleged violator submits to the Commissioner a written request for review of the proposed decision.
  
- (j) After review of the proposed decision under Subsection I, with or without a hearing on the record, the Commissioner shall issue an order that affirms, modifies or vacates the proposed decision.



**SP 1-1 PROJECT DESCRIPTION**

**CONTRACT NO.:** MA 679-000-002

**TITLE:** Upgrade and Replace Existing Signing – Northern Region

**FACILITY:** John F. Kennedy Memorial Highway and Thomas J. Hatem Memorial Bridge

**LOCATION:** Baltimore County, Maryland; Harford County, Maryland; Cecil County; Maryland and New Castle County, Delaware

**ADVERTISED:** March 23, 2010

**PRE-BID MEETING:** **9:30 am on April 7, 2010** in the Conference Room at the Maryland Transportation Authority, 303 Authority Drive, 1<sup>st</sup> Floor, Administration Building, Baltimore, MD 21222

**PROJECT CONTACT:** Project Manager: Ms. Roxane Y. Mukai at (410) 537-7848  
Contract Administration: Ms. Maggie Johnson (410) 537-7807

**BIDS DUE:** **12:00 Noon on April 29, 2010**, in the Bid Box on the 1<sup>st</sup> floor of the Maryland Transportation Authority, Engineering Building, 300 Authority Drive, Baltimore, MD 21222

**CLASSIFICATION:** Class F (\$ 5,000,001 – \$ 10,000,000)

**CONTRACT TIME:** Five Hundred and Forty (540) Calendar Days

**LIQUIDATED DAMAGES:** **\$ 800.00 per Calendar Day**

**MINIMUM MBE GOALS:** Overall 25 %  
Women owned businesses 0%  
African-American owned businesses 0%

**BID DOCUMENTS:** \$60.00 - Bid documents can be purchased between 7:30am and 3:30pm, Mondays, Wednesdays, Thursdays and Fridays and between 10:00am and 4:00pm on Tuesdays at the Ticket Office located at the Francis Scott Key Bridge, Maryland Transportation Authority, Administration Building, 303 Authority Drive, Baltimore, MD 21222.



### **Location and Scope of Work**

This project is located along I-95 from north of the MD 43 Interchange in Baltimore County to the Delaware state line.

The project includes fabricating, installing, removing and/or replacing overhead, cantilever, bridge mounted and ground mounted signs and sign structures. The work includes both static and dynamic message signs. Work also involves modifications to bridge structures necessary to perform the signing and sign structures work.

### **SP 1-2 SPECIFICATIONS**

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "Standard Specifications for Construction and Materials" dated July 2008, revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

### **SP 1-3 ORIGINAL FACILITY PLANS AND SITE VISITS**

The original facility plans are on file at the Engineering/Finance Building of the Francis Scott Key Bridge and will be made available for inspection to prospective bidders. Parties interested in viewing the plans should contact Ms. Roxane Y. Mukai, Traffic Manager at (410) 537-7848. Parties interested in visiting the site should contact Mr. John Lohmeyer, Administrator, Northern Region, at (410) 537- 1107.

### **SP 1-4 - PROMPT PAYMENT TO SUBCONTRACTORS**

The prime Contractor is responsible for making timely payments to all Subcontractors and Suppliers as required in the 1988 edition of the State Finance and Procurement Article of the Annotated Code of Maryland, Section 17-106.

This contract requires the Contractor to make payment to all Subcontractors within 10 days of receiving payment from the Authority.

Each month, the construction Project Engineer will review the current pay items with the prime Contractor and all involved Subcontractors to ensure that all work satisfactorily completed within specifications is included in the monthly progress payment. For payment purposes, the same quantity totals used to compute the payment to the prime Contractor will be the basis for payment to the Subcontractor.

If the Subcontractor does not receive payment within the required 10 days, the Subcontractor shall notify the Project Engineer in writing of the amount in dispute including the item numbers and payment quantity for each. The Project Engineer will then notify the Director of



Construction of the dispute. The Director of Construction or his representative will verbally contact the prime Contractor within 48 hours to ascertain whether or not a performance dispute exists which necessitates non-payment to the Subcontractor. If a performance dispute exists, the prime Contractor must demonstrate that there is a valid basis to withhold payment from the Subcontractor. If the prime Contractor withholds payment from a Subcontractor, the prime Contractor shall provide to the Subcontractor written notice of the withholding of payment. The notice shall detail the reasons for withholding payment as well as the amount. A copy of the notice shall be provided to the Surety and the Authority. If no valid dispute exists, the prime Contractor will be directed to make immediate payment to the Subcontractor. The Subcontractor will be responsible for notifying the Director of Construction if this payment is not made. Upon receipt of notification, the Director of Construction will schedule a meeting with the Contractor and Subcontractor to verify and discuss the non-payment issue. This meeting will be held at the Authority's offices within 2 working days of the Authority's contact with the subcontractor. If it is determined that the prime Contractor has withheld payment to the Subcontractor without cause, further progress payments to the prime Contractor will be withheld until the Subcontractor is paid. In addition, the Authority may order a suspension of work or other administrative actions as it sees fit.

If an action is taken as stated above the Contractor shall notify the Authority's Project Engineer when payment is made. After the Authority's Project Engineer verifies that payment has been made to the Subcontractor the Authority shall release withheld progress payments.

Nothing in this Special Provision shall be construed to prevent the Subcontractor from pursuing a claim with the surety under the prime Contractor's payment bond at any time.

#### **SP 1-5 WORK HOURS**

Except as noted in Section 104 - Maintenance of Traffic and these contract documents, the Contractor is permitted to work twenty four (24) hours a day, seven (7) days a week.

#### **SP 1-6 INSURANCE**

##### **TC-5.01 INSURANCE**

Section TC 5.01 of the Standard Specifications is supplemented as follows:

1. The Contractor shall not commence work under this contract until he has obtained all of the minimum amounts of insurance required by these Special Provisions and the insurance has been approved by the Engineer. The Contractor shall furnish to the Maryland Transportation Authority ("Authority") duly executed certification of all required insurance on forms satisfactory to the Authority. The certificates of insurance shall state that it is in force and cannot be cancelled, release or non-renewed except upon thirty (30) days prior written notice, registered mail to the Authority. All Contractors'



insurance policies, with the exception of the Worker's Compensation and Employer's Liability, shall be endorsed to provide as additional insureds the Maryland Transportation Authority and the State of Maryland.

2. The Contractor shall purchase and maintain such insurance as is specified herein which will provide the Authority, its members, employees and agents, as well as the Contractor from claims which may arise out of or as a result of the Contractor's operations under this contract, whether such operations be by the Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them or by anyone whose acts any of them may be liable. This insurance shall be maintained in full force until the Contract has been accepted by the Authority and final payment is made.
3. The Authority requires the following minimum levels of insurance coverage for this contract:

a) Worker's Compensation and Employer's Liability

The Contractor shall, at all times, maintain and keep in force such insurance as will protect him from claims under the Worker's Compensation Act of the State of Maryland and maintain and keep Employer's Liability Insurance at a limit of \$100,000. The Contractor shall also maintain United States Long Shore and Harbors Act coverage, if such exposure exists.

b) Comprehensive General Liability Insurance

The Contractor shall maintain Comprehensive General Liability Insurance in the amount of at least One Million Dollars (\$1,000,000) Combined Single Limit for Bodily Injury Liability and Property Damage Liability Insurance per occurrence and in the aggregate. Such insurance shall specifically include the Comprehensive General

Liability Broad Form Endorsement and indicate explosion, collapse, and underground damage coverage.

c) Comprehensive Automobile Liability Insurance

The Contractor shall maintain Comprehensive Automobile Liability Insurance (including all automotive equipment owned, operated, rented, or leased), in the amount of at least Five Hundred Thousand (\$500,000) Combined Single Limit for bodily injury and property damage.

d) Additional Insurance

The Contractor shall also procure and keep in effect:



Excess liability (umbrella coverage) in excess of and applicable to the coverage in the Comprehensive General Public Liability and Property Damage Insurance, "X, C, U" and Comprehensive Automobile Insurance in the amount of at least Two Million Dollars (\$2,000,000) for each occurrence.

4. Accident Notification - The Contractor shall send a written report to the Engineer and to the Maryland Transportation Authority within twenty-four (24) hours of any accident or other event arising in any manner from the performance of the contract which results in or might result in personal injury or property damage.
5. Failure to comply with these Special Provisions may lead to termination from default/convenience.
6. There will be no special payment for the insurance as required by this contract and all costs incidental thereto shall be included in the (Lump Sum for "Mobilization", (refer to Section 108), or if the Contract does not include such an item, the insurance costs are to be included in pay items for the Proposal.

**SP 1-7 MINORITY BUSINESS ENTERPRISE REGULATIONS GOVERNING  
CONSTRUCTION CONTRACTS IN EXCESS OF \$50,000  
EFFECTIVE JULY 1, 2001**

GP – 7.29 of the General Provisions is supplemented as follows:

MBE participation goal for this contract is as indicated in these Special Provisions.

The Contractor shall:

1. Identify specific work categories appropriate for subcontracting;
2. At least 10 days before bid opening, solicit Minority Business Enterprises, through written notice that:
  - a) Describe the categories of work: and,
  - b) Provide information regarding the type of work being solicited and specific instructions on how to submit a bid.
3. Attempt to make personal contact with Minority Business firms:
4. Assist Minority Business Enterprises to fulfill bonding requirements or to obtain a waiver of these requirements:



5. Upon acceptance of a bid, provide the Maryland Transportation Authority (MdTA) with a list of Minority Businesses with whom the Contractor negotiated, including price quotes from Minority and Non-minority firms.

**Third Tier Subcontracting:**

Third Tier MBE/DBE Subcontracting will be approved by MdTA only when MdTA is satisfied that there is no way except by Third Tier contracting that an MBE/DBE goal can be achieved. The Contractor's written request must be submitted prior to contract award and contain specifics as to why a Third Tier contracting agreement is being requested.

**Waivers:**

If for any reason the bidder/offerer is unable to achieve the specified overall contract goal or subgoals for each certified MBE classification, the bidder/offerer must request, in writing, on Attachment A, (Certified MBE Utilization and Fair Solicitation Affidavit), a waiver at time of bid.

Strict adherence regarding documentation of the rationale for the waiver request and documentation of "Good Faith Efforts" of the Contractor are required for consideration of any waiver. For additional information on waivers, please see *COMAR 21.11.03.11*

**Criminal Fraud Provisions:**

All Contractors are reminded that Criminal Fraud Provision and Administrative Sanctions may be imposed for failure to achieve and maintain established MBE/DBE goals.

**SP 1-8 PROGRESS SCHEDULE REQUIREMENTS**

Refer to Section 109 of the Standard Specifications.

**SP 1-9 CORPORATE REGISTRATION**

A foreign corporation is any corporation not incorporated under the Laws of the State of Maryland. All foreign corporations, prior to performing any services for the Authority, must register with the Maryland State Department of Assessment and Taxation in compliance with Article 23, Section 90, Annotated Code of Maryland. Compliance is required of the successful vendor as well as the proposed subcontractors.

To accomplish the required registration, a foreign corporation must request and complete "Qualification Application Forms" which can be obtained from the Department of Assessment and Taxation, State Office Building, Room 803, 301 West Preston Street, Baltimore, Maryland 21201. Forms can be obtained via web site at e-mail address: [www.dat.state.md.us](http://www.dat.state.md.us).



Maryland  
Transportation  
Authority

The Contractor will be responsible for documenting compliance with the aforesaid. This documentation will be required prior to the execution of a contract with the successful bidder.

#### **SP 1-10 CONTRACTOR'S EMPLOYEE IDENTIFICATION**

The Contractor shall provide to the Authority, a list containing the following for Contractor and all sub-contractors that would be working at the site. This shall include trucking companies who would come to the site on a repetitive basis to supply or remove materials:

- Name of Company
- Name and Title of contact person
- Address of Company
- Phone Number
- Facsimile number
- E-Mail address of contact person (if any)

All Contractor's employees, including employees of subcontractors, on this project, present at the site, shall be in possession of a valid employee identification card provided by the Employer, which shall contain a photograph and identify the employee by name and job title. The employee must produce the said identification if required to do so by the Engineer or the Authority Police.

When working in or around the Authority's buildings, said employees identification shall be displayed at all times.

While working on the transportation facility projects of the Authority, Contractor's personnel shall have an ID decal displayed on their hardhat. These decals will be provided by the Authority. All Contractor's vehicles shall have a parking decal, attached to the rear view mirror. These parking decals will also be provided by the Authority and a distribution list will be maintained. At the time of project completion these decals shall be returned to the Authority. Request for hardhat and rearview mirror decals shall be made to the Construction Section before the beginning of construction and should include the number required of each type.

All costs associated with ID's will not be paid for separately and shall be incorporated under other items of payment in the contract.



**GENERAL PROVISIONS  
GP-SECTION 1  
DEFINITIONS AND TERMS**

**GP 1.03 – ORGANIZATIONAL DEFINITIONS**

Revise the definitions of Administration to read as follows:

Administration – The word “Administration” shall mean “Maryland Transportation Authority”.

Except for Office of Materials and Research, all references to the Maryland State Highway Administration’s offices and positions shall mean the Authority’s corresponding offices and positions.



Maryland  
Transportation  
Authority

SPECIAL PROVISIONS  
Contract No. MA 679-000-002

**GENERAL PROVISIONS  
GP- SECTION 1  
DEFINITIONS AND TERMS**

**GP 1.05 - DEFINITIONS**

Add the following definitions:

**Highway Standards** - The official Book of Standards for Highway and Incidental Structures, edited by the State Highway Administration, with the latest incorporated revisions issued on or before the date of advertisement on the contract.



**GENERAL PROVISIONS  
GP-SECTION 2  
BIDDING REQUIREMENTS AND CONDITIONS**

**GP-2.06 PREPARATION OF THE BID**

GP9 **ADD:** After paragraph (a), the following.

The Contractor may elect to submit his bid on forms he has generated in the development of his bid. These may be submitted in lieu of the schedule of prices bid forms furnished by the Administration in the Invitation for Bids. These forms shall emulate the forms currently furnished by the Administration and, at a minimum, contain the following information.

- (1) State Contract No.
- (2) State Item Nos.
- (3) State's Estimated Quantity(s)
- (4) Description of Item(s)
- (5) Unit Price(s)
- (6) Total Cost of Each Item
- (7) Total Bid Amount

The document shall be 8-1/2 x 11 inches, and oriented in a landscape format. The font size shall be no less than 10 points with horizontal lines dividing each item. Any addendum which revised items or quantities shall be noted on all affected schedule of prices sheets. Any special bid requirements that are noted in the schedule of prices shall also be listed on the form.

Should the Contractor elect to submit bids on the Contractor's own forms, the Contractor shall submit a sample of the form to the Administration at least two weeks prior to the scheduled opening of bids. The use of Contractor generated forms shall be approved, in writing, prior to their use. If the Contractor's forms were previously approved in writing on another Administration project and have not changed, they need not be resubmitted for this project.

Sample forms shall be submitted to:

Ms. Linda McGill, CPPB  
Chief Procurement Officer  
Maryland Transportation Authority  
300 Authority Drive  
Baltimore, MD 21222



**GENERAL PROVISIONS  
GP-SECTION 2  
BIDDING REQUIREMENTS AND CONDITIONS**

**GP 2.23 - BID PROTESTS**

Section GP 2.23 of the General Provisions is supplemented as follows:

The Board of Public Works does not have the jurisdiction to consider protests relating to this solicitation or an award of this contract under this solicitation.

All protests relating to this solicitation, the selection, and/or award must be filed in writing with the Authority's Procurement Officer, within the time limitations set forth in COMAR 21.10.07 and 21.10.02. Bid protests shall be filed not later than 7 days after the basis for protest is known, or should had been known, whichever is earlier. Oral protests will not be considered.

The specific details of the protest procedures shall be followed by aggrieved actual or prospective bidders or offerors are contained in COMAR 21.10.



**GENERAL PROVISIONS  
GP SECTION 4  
SCOPE OF WORK**

**GP 4.10 - WARRANTY OF CONSTRUCTION**

GP 4.10 of the Standard Specifications is revised to read as follows:

Delete: The first paragraph in its entirety.

Insert: The following:

The Warranty as defined under paragraphs A through G in GP 4.10 (Warranty of Construction) shall apply to this Maryland Transportation Authority contract unless specified elsewhere in this Invitation for Bids.



**GENERAL PROVISIONS  
GP SECTION 5  
CONTROL OF WORK**

**GP 5.12 - FAILURE TO MAINTAIN ENTIRE PROJECT**

**Delete:** Section GP 5.12 in its entirety

**Insert:** Revise the paragraph to read as follows:

Failure on the part of the Contractor, at any time, to RESPOND TO the provisions of GP 5.11 above, will result in the procurement officer's immediately notifying the Contractor to comply with the required maintenance provisions. In the event that the Contractor fails to PROCEED WITH CORRECTIONS TO UNSATISFACTORY MAINTENANCE SO AS TO CONFORM TO THE PROVISIONS OF GP 5.11 within 4 hours of receipt of such notice, the procurement officer MAY NOTIFY THE CONTRACTOR TO SUSPEND ALL OTHER WORK ON THE CONTRACT UNTIL SUCH TIME AS THE UNSATISFACTORY MAINTENANCE IS CORRECTED. In the event that the Contractor fails to RESPOND TO unsatisfactory maintenance within 4 hours after receipt of such notice, the procurement officer may immediately proceed with adequate forces and equipment to maintain the project, and the entire cost of this maintenance will be deducted from monies due the Contractor ON THE NEXT MONTHLY ESTIMATE.



**GENERAL PROVISIONS  
GP SECTION 8  
PROSECUTION AND PROGRESS**

**GP 8.09 - LIQUIDATED DAMAGES**

**Delete:** Section GP 8.09 in its entirety

**Insert:** Time is an essential element of the Contract and it is important that the work be vigorously prosecuted until completion.

For every calendar day that the contract remains uncompleted after the expiration of the contract time specified herein, or amended by extra work authorization, change orders or supplemental agreements, the Contractor will be liable for Liquidated Damages. The amount of Liquidated Damages shall be as specified in Contract Time and Bonding. This amount shall be deducted from any money due the Contractor, not as a penalty, but as Liquidated Damages. Damages in excess of any retained percentage shall be paid to the Authority by the Contractor.

Refer to Contract Time and Bonding sheet contained elsewhere herein. See Table of Contents.



**GENERAL PROVISIONS  
GP SECTION 9  
PAYMENT**

**GP 9.05 LATE PAYMENTS**

**ADD the following:**

- (e) Payments will be made within thirty (30) days of the date when the contract amount becomes due and payable or the date of receipt of a proper invoice, whichever is later. The State's failure to remit payment within forty-five (45) days from that date may entitle the Contractor to interest at the rate of 10% per annum beginning on the 31<sup>st</sup> day.



**TERMS AND CONDITIONS  
TC SECTION 4  
CONTROL OF WORK**

**TC 4.01 - SHOP PLANS AND WORKING DRAWINGS**

Section TC 4.01 of the Specifications is amended to add:

All shop plans and working drawings for this project shall be submitted to:

Maryland Transportation Authority  
Engineering Division  
300 Authority Drive  
Baltimore, Maryland 21222-2200  
ATTN: Ms. Roxane Y. Mukai

The Contractor shall allow a minimum of four (4) weeks turn around time on all drawings from the date they are received by the Authority. All shop plans and working drawings shall be reviewed and approved by the Contractor prior to submitting for approval to the Maryland Transportation Authority and shall be submitted by the Prime Contractor only. No drawings sent to the Authority directly by Subcontractors, fabricators, etc. will be accepted. Ten (10) sets of drawings shall be submitted for approval.

Acceptance of a material source by the Engineer does not constitute approval of the material as a substitute or as an "equal". Submission of a material as an "or equal" must be done in accordance with the following paragraphs:

All shop drawings, regardless if "Submitted as Specified" or "Submitted as Equal to Specified", shall be furnished with complete, specific, detailed information from the manufacturer or supplier or the material or equipment the Contractor proposes to furnish, in which the requirements of the Specifications are clearly shown to be met. This shall include a point by point comparison with the detail requirements of the Specifications.

When any article is specified by trade name of manufacturer with or without the clause "or equal", it is intended to establish the quality of the article. If the Contractor proposes to use material or equipment of another manufacturer as an "or equal" to material or equipment specified, all shop drawings shall conform to the following requirements, conditions, and procedure:

1. Substitution of equipment or materials other than those specified will be considered, providing, in the opinion of the Engineer, such equipment or material is equal to, or better than specified. The decision of the Engineer with respect to



approval or disapproval of any material or equipment proposed to be substituted as an "or equal" is final. The Contractor shall have no claim of any sort by reason of such decision.

2. If the Contractor proposes to substitute materials or equipment as "or equal" to those specified, it shall be his responsibility to furnish, in addition to the information discussed above, a point by point comparison of the material or equipment specified under the Contract and that proposed to be substituted. The burden of responsibility in furnishing this information is with the Contractor.

If incomplete or irrelevant data is submitted as evidence of compliance with this section of the Specifications, the data will be returned and the request for approval will be denied.

**TERMS AND CONDITIONS  
TC SECTION 4  
CONTROL OF WORK**

**TC-4.02 FAILURE TO ADEQUATELY MAINTAIN PROJECT.**

98 **ADD:** At the end of the sub-section.

Additionally, an appropriate deduction will be made from the Contractor's next progress estimate for each day or portion thereof that Maintenance of Traffic deficiencies exist, and will continue until the deficiencies are satisfactorily corrected and accepted by the Engineer. Any portion of a day will be assessed a full day deduction. The deduction will be equal to a prorata share of the lump sum price bid for Maintenance of Traffic or an amount prorated from the Engineer's estimate, whichever is more. The amount prorated will be the per diem amount established by using the working days (based upon calendar dates when required) divided into the total value of the bid item or the Engineer's estimate of that item, whichever is more.

The above noted deduction will be assessed on the next progress estimate if:

The Contractor does not take action to correct the deficiencies and properly assume the responsibilities of maintaining the project (as determined by the Engineer) within four hours of receiving a notice to comply with the required maintenance provisions.

The deduction will be equal to the daily prorated share of the lump sum price bid for Maintenance of Traffic or \$500.00 per day, whichever is more for each day or portion thereof that the deficiencies exist, and will continue until the deficiencies and proper assumption of the required maintenance provisions are satisfactorily corrected and accepted by the Engineer. The amount of monies deducted will be a permanent deduction and are not recoverable. Upon satisfactory correction of the deficiencies, payment of the Maintenance of Traffic lump sum item will resume.



**TERMS AND CONDITIONS  
TC SECTION 5  
LEGAL RELATIONS AND PROGRESS**

**TC-5.01 INSURANCE.**

17 **DELETE:** The first three paragraphs under TC-5.01 in their entireties.

**INSERT:** The following.

The requirement of GP-7.14 (Liability Insurance) to submit Certificate of Insurance prior to starting work is modified for Administration Contracts to require the certificate of insurance to be submitted prior to the execution of the Contract.

The Contractor shall maintain in full force and effect third party legal liability insurance necessary to cover claims arising from the Contractor's operations under this agreement which cause damage to the person or property of third parties. The insurance shall be under a standard commercial general liability (CGL) form endorsed as necessary to comply with the above requirements; or other liability insurance form deemed acceptable by the State. The State of Maryland shall be listed as an additional named insured on the policy. The limit of liability shall be no less than \$1,000,000 per occurrence/\$2,000,000 general aggregate. The insurance shall be kept in full force and effect until all work has been satisfactorily completed and accepted. The policies shall be endorsed to provide 30 days notice of cancellation or non-renewal to:

Director of Construction  
Maryland Transportation Authority  
304 Authority Drive  
Baltimore, Maryland 21222



**TERMS AND CONDITIONS**  
**TC SECTION 7**  
**PAYMENT**

**DELETE:** TC-7.05 PROGRESS PAYMENTS Subsection (a) (3) Variable Retainage

**INSERT:** The following.

- (3) **VARIABLE RETAINAGE.** The Contract will be subject to a variable retainage based upon the Authority's performance evaluations of the Contractor.

Those qualifying may have retainage reduced upon request of the Contractor with consent of surety. This request must be processed through the Director of Construction. If at any time during the performance of the project, the evaluation of the Contractor changes, retainage reduction may be reconsidered.

Contractors with "A" evaluations for the last two years may be reduced from 5 percent to 2.0 percent upon request after 15 percent project completion. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project must be completed and must be an "A". Contractors with "A" evaluations for the last two years may petition to have all retainage at that point released upon completion of a significant milestone. Retainage will continue at 2.0 percent until the next milestone of completion of the contract.

Contractors with "B" evaluations or any combination of "A" and "B" evaluations for the last two years may be reduced from 5 percent to 2.5 percent at 50 percent project completion and remain at that level until released upon final payment. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project shall be completed and shall be an "A" or "B".

Contractors with "C" evaluations or any combination of "C" and "D" evaluations for the last two years will begin and remain at 5 percent for the life of the project. An interim evaluation of the current project shall be completed and shall be a "C" or better rating.

Contractors with a "D" evaluation for the last two years will begin at 5 percent. Project performance will be evaluated monthly. Should the contractor performance remain at the "D" level, to protect the State's interest 10% of the progress payment will be withheld until performance improves to a "C".

**New Bidders.** Contractors who have not been previously rated by the Authority may be eligible for a reduction in retainage. To be eligible, their past performance on highway and bridge work shall be documented by the government agency with whom they had a contract and their performance shall be documented on Authority forms.

All other Contractors who do not fit into the above criteria would be subject to a 5 percent retainage throughout the life of the Contract.



**CATEGORY 100  
PRELIMINARY**

**SECTION 103 — ENGINEERS OFFICE**

**103.03 CONSTRUCTION.**

**103.03.05 Requirements for all Offices.**

144 **ADD:** the following after (v).

(w) One paper shredder capable of shredding at least 10 sheets (20 lb bond) at a time. Throat width of at least 12 in. Speed of at least 20 feet per minute. Auto reverse or auto stop for paper jams. Power of at least 115 v.

146 **DELETE:** 103.03.09 Recyclable Materials (Paper, Bottles, Cans, Etc.) in its entirety.

**INSERT:** The following.

**103.03.09 Recycling.** Recycling of recyclable paper (bond, newsprint, cardboard, mixed paper, packaging material and packaging), bottles (glass and plastic), and aluminum cans will be required at the Engineer's Office and the Contractor's facilities for the project.

Furnish approved containers, and remove the material from the site on an approved schedule or as directed. All material shall be taken to an authorized recycling facility. Maintain a log for the duration of the project documenting the type of materials recycled. The log shall include the types of material, date, time, location of facility, and signature line. Furnish a copy of the log at the completion of the project and upon request.

The Contractor shall be considered the owner of any profit and be responsible for all incurred costs.

**CATEGORY 100  
PRELIMINARY**

**SECTION 104 — MAINTENANCE OF TRAFFIC**

**104.01 TRAFFIC CONTROL PLAN (TCP).**

**104.01.01 DESCRIPTION.**

149 **DELETE:** The fourth paragraph sentence “Refer to contract Documents for Work Restrictions.” in its entirety.

**INSERT:** The following.

**Agency Contacts.**

CONTACT	TITLE	PHONE NUMBER
John Lohmeyer	JFK & TJH Administrator	410-537-1107
Eric Rumer	JFK I Maintenance Supervisor	410-537-8102
Eric Morris	JFK II Maintenance Supervisor	410-537-8153
Dan Sawyer	JFK Utility Coordinator	410-537-1118
Roxane Y. Mukai	Traffic Manager	410-537-7848
Erin Kuhn	SHA Dist. 4 – Assistant District Engineer, Traffic.	410-321-2781
Jeff Wentz	SHA Dist. 2 – Assistant District Engineer, Traffic.	410-810-3240
Abey Tamrat	Project Engineer, Structures	410-537-7822
Bob Jordan	IT and Electrical Engineering Manager	410-537-7851
Robert Ziemski	Area Engineer	410-537-7883
Don Crain	IT maintenance	410-537-1114

**Work Restrictions.** On Monday of each week, the Contractor shall provide the Engineer with a complete list of anticipated lane and shoulder closures for the following two weeks, allowing the Authority a minimum of fourteen (14) calendar days or ten (10) working days notification. The Engineer shall then notify the affected facilities, the Engineering Division’s Traffic Section and other appropriate offices. No lane closures shall be made without prior written approval of the Engineer in the form of an Authority lane/shoulder closure permit. The Authority is not responsible for lost workdays resulting from the Contractor failing to submit schedules or providing notification of maintenance of traffic requirements in a timely manner. Other contractors may be actively working in or around the vicinity of this project. The Contractor shall cooperate with and coordinate work activities with contractors in adjoining or overlapping work areas.

When working at the Thomas J. Hatem Memorial Bridge, the Contractor must provide a

means of communication to the Thomas J. Hatem Memorial Bridge Police detachment as a safety requirement. Acceptable forms of communication shall consist of a mobile telephone, citizens band or portable two-way radio.

The Contractor is responsible for obtaining lane/shoulder closure or other Permits from all affected agencies that require permits for work on their right of way, including those listed in this Special Provision. The Contractor shall make contact with the representative from the affected agency, through the Project Engineer and provide a copy of all coordination correspondence to the Authority. Sufficient time shall be allowed for review and approval of the permit application.

<b>TEMPORARY LANE OR SHOULDER CLOSURE SCHEDULE</b>			
<b>ROADWAY</b>	<b># LANE(S) / SHOULDER CAN BE CLOSED</b>	<b>DAY OF THE WEEK</b>	<b>CLOSURE PERIOD (TIME OF DAY)</b>
US 40 – Thomas J. Hatem Memorial Bridge	Single Lane	Monday – Thursday	9:00 AM – 2:00 PM
	Single Lane	Monday – Thursday	7:00 PM – 5:00 AM
I-95 – John F. Kenneday Memorial Highway	Shoulder Closure	Monday – Sunday	Continuous
	Single Lane Closure	Monday – Thursday	9:00 AM – 3:00 PM
	Single Lane Closure Northbound	Monday – Thursday in three lane sections	7:00 PM – 5:00 AM
	Single Lane Closure Northbound	Monday – Thursday in four lane sections	9:00 PM – 5:00 AM
	Single Lane Closure Southbound	Monday – Thursday	7:00 PM – 5:00 AM
	Single Lane Closure Southbound	Monday – Thursday south of the Little Gunpowder River	Thanksgiving through New Years 9:00 PM – 5:00 AM
	Single Lane Closure	Friday	9:00 AM – 12:00 Noon
	Double Lane Closure Northbound	Monday – Thursday in three lane sections	9:00 PM – 5:00 AM

	Double Lane Closure Northbound	Monday – Thursday in four lane sections	11:00 PM – 5:00 AM
	Double Lane Closure Southbound	Monday – Thursday	9:00 PM – 5:00 AM
	Double Lane Closure Southbound	Monday – Thursday south of the Little Gunpowder River	Thanksgiving through New Years 10:00 PM – 5:00 AM
	Triple Lane Closure Northbound	Monday – Thursday in four lane sections	12:00 Midnight – 5:00AM
	Triple Lane Closure Southbound	Monday – Thursday in four lane sections	11:00 PM – 4:00 AM

If a holiday falls during a weekend or on the day preceding and/or following a weekend, no work will be allowed on that weekend or on the day preceding or following that weekend.

Work is not permitted on the holidays, or work day preceding and following holidays indicated below with an “X”. In addition, no work will be allowed on the Tuesday prior to Thanksgiving Day, and the following Monday after Thanksgiving Day.

- New Year's Day, January 1
- Martin Luther King's Birthday, the third Monday in January
- President's Day, the third Monday in February
- Good Friday
- Easter Sunday
- Memorial Day, the last Monday in May
- Independence Day, July 4
- Labor Day, the first Monday in September
- Columbus Day, the second Monday in October
- Veteran's Day, November 11
- Thanksgiving Day, the fourth Thursday in November
- Christmas Day, December 25

The Engineer reserves the right to modify or expand the methods of traffic control or working hours as specified in the Contract Documents. Any request from the Contractor to modify the work restrictions shall require written approval from the Engineer at least 72 hours prior to implementing the change. The Contractor shall submit a copy of the original work restrictions with the written request.

As directed by the Engineer, temporary lane and shoulder closures will not be permitted during periods of falling precipitation, in heavy fog or otherwise poor visibility, or in the event of emergencies such as serious traffic accidents or unusually severe traffic congestion. In the event that a temporary lane or shoulder must be reopened as directed by the Engineer or authorized Authority staff, the Contractor shall evacuate all equipment, materials and personnel from the lane within thirty (30) minutes.

- 149 **ADD:** The following after the last paragraph, “Any monetary savings...and the Administration.”

When closing or opening a lane on freeways, expressways, and roadways with posted speed  $\geq 45$  mph, a work vehicle shall be closely followed by a protection vehicle (PV) during installation and removal of temporary traffic control devices. The PV shall consist of a work vehicle with approved flashing lights, a truck-mounted attenuator (TMA) with support structure designed for attaching the system to the work vehicle, and arrow panel (arrow mode for multilane roadways and caution mode on two-lane, two-way roadways) The work vehicle size and method of attachment shall be as specified in the TMA manufacture’s specification as tested under NCHRP Test Level 3.

When a temporary lane or shoulder closure is in effect, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings and shall discuss traffic control and the Traffic Control Plan including procedures to be implemented for lane closures.

All closures shall be in conformance with the approved TCP and under the direction of the Contractor's Certified Traffic Manager and the Engineer.

Workers and equipment, including temporary traffic control devices needed for setting up a lane closure or restriction, are prohibited in the lane or shoulder to be closed or restricted before the time permitted in the Contract work restrictions unless otherwise noted below or as approved by the Engineer.

Temporary traffic control devices to be used for lane/shoulder closure may be placed on the shoulder of the roadway by workers no earlier than 15 minutes prior to actual time lane/shoulder closure or restriction is permitted. Temporary traffic signs may be displayed to traffic at this time.

Workers shall not enter a lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 15 minutes prior to actual time lane/shoulder closure or restriction is permitted.

All temporary lane or shoulder closures shall be restored at the end of the closure period

and no travel lane shall be reduced to less than 11 ft. Prior to opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction being assessed on the next progress estimate in conformance with the following. This is in addition to the requirements specified in TC-4.02.

<b>ELAPSED TIME, MINUTES</b>	<b>DEDUCTION</b>
1 - 5	\$ <u>50.00</u>
Over 5	\$ <u>50.00</u> per Minute (In addition to the Original 5 minutes)



**CATEGORY 100  
PRELIMINARY**

**SECTION 104 — MAINTENANCE OF TRAFFIC**

166 **DELETE** Section 104.11 TEMPORARY PAVEMENT MARKINGS. in its entirety.

**INSERT**: The following.

**104.11 TEMPORARY PAVEMENT MARKINGS.**

**104.11.01 DESCRIPTION.** Furnish, install, and remove temporary pavement markings as specified in the Contract Documents or as directed by the Engineer. These markings shall include lines, letters, numbers, arrows, and symbols.

**104.11.02 MATERIALS.**

Removable Preformed Pavement Marking Material	Refer to the
Nontoxic Lead Free Waterborne Pavement Markings	Contract Documents
Black Out Tape	QPL

**104.11.03 CONSTRUCTION.**

**104.11.03.01 Quality Assurance/Quality Control.** Quality control testing shall be completed by the Contractor’s Administration certified technicians. The Engineer will complete the quality assurance checks in conformance with MSMT 729 by performing the Nighttime Visibility Evaluations.

**104.11.03.02 Warranty Period.** The Contractor shall maintain and be responsible for any defects in the pavement markings for a period of 180 days from the date of application. The Contractor shall replace the pavement markings as necessary within this period as directed by the Engineer at no additional cost to the Administration. Refer to GP-5.11.

**104.11.03.02 Application and Removal.** The pavement markings shall be applied in conformance with the manufacturer’s recommendations and the Contract Documents. Markings shall be applied in the same direction as the flow of traffic. The markings shall be located as specified in the Contract Documents or as directed by the Engineer.

Pavement markings may be applied to either new or existing paved surfaces. When applied to newly paved surfaces, the markings shall be placed before traffic is allowed on the pavement. Nontoxic lead free waterborne pavement markings shall be used for all temporary pavement markings except for the final surface. However, the Contractor may use removable preformed pavement markings at no additional cost to the Administration.

When at the “end of season”, the temperatures are too low to allow the placement of removable tape on the final surface, a written exception request may be submitted to the Engineer to allow the use of nontoxic lead free waterborne paint in lieu of removable tape until the following striping season.

When it is appropriate to shift lanes, all nonapplicable pavement markings within the travel way and adjacent to the travel way as directed by the Engineer shall be completely removed.



**Surface Condition.** Prior to application of pavement markings, the pavement surface shall be clean, dry, and free of all contaminants, including curing compound, dirt, and loose particles. Residual pavement markings shall be removed. Loose or poorly constructed markings shall also be removed.

**Pavement Marking Removal.** All removable preformed pavement markings shall be completely removed prior to application of the permanent markings. On stage construction or final surfaces of portland cement concrete pavements, any objectionable adhesive residue shall be removed by water blasting or other methods as may be approved by the Engineer. Open flame is prohibited to remove adhesive residue, or any pavement markings. The Contractor shall remove all nonapplicable pavement markings so that there is no damage to the existing or final surface.

**Retroreflectance.** The initial retroreflectance readings for temporary pavement markings shall be a minimum of 250 and 150 millicandellas/lux/square meter for white and yellow, respectively. The Engineer will monitor the pavement markings in conformance with MSMT 729 during the Contractor's 180 day period of responsibility.

**104.11.04 MEASUREMENT AND PAYMENT.** Payment for Removable Preformed Pavement Markings, Removal of Removable Preformed Pavement Markings, Nontoxic Lead Free Waterborne Pavement Marking Paint, and the Removal of Existing Pavement Markings will be measured and paid for using one or more of the items listed below and as specified in the Contract Documents.

The payment will be full compensation for furnishing, placing, complete removal of lines, letters, numbers, arrows, symbols, and the removal of all residue. In addition, payment will cover maintenance and replacement during the 180 day period, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal and replacement of temporary pavement markings required beyond the 180 day period will be measured and paid for at the Contract unit price for the pertinent temporary pavement marking item.

Temporary markings replaced during the 180 day period as a result of plowing (as determined by the Engineer) will be paid for at the Contract unit price for the pertinent temporary marking item.

- (a) Nontoxic Lead Free Waterborne Pavement Marking Paint-in width specified-per linear foot.
- (b) Removable Preformed Pavement Line Markings-in width specified-per linear foot.
- (c) Removable Preformed Letters, Symbols, Arrows, and Numbers per each.
- (d) Removal of Removable Preformed Pavement Markings-any width-per linear foot.
- (e) Removal of Removable Preformed Letters, Symbols, Arrows and Numbers per each.
- (f) Removal of Existing Pavement Line Markings-any width per linear foot.
- (g) Removal of Existing Letters, Symbols, Arrows, and Numbers per each.
- (h) Black Out Tape Lines-in width specified-per linear foot.
- (i) Removal of Black Out Tape Lines-any width-per linear foot.



**CATEGORY 100  
PRELIMINARY**

**SECTION 104 — MAINTENANCE OF TRAFFIC**

**104.14 CONES FOR MAINTENANCE OF TRAFFIC.**

**104.14.02 MATERIALS.**

171 **DELETE:** First paragraph on this page “Cones shall be...an upright position”.

**INSERT:** The following.

All cones shall meet MdMUTCD and be new or like new condition. All cones shall be orange in color. Cones shall be at least 28 in. high, 10 in. diameter at the inside of the base, and reflectorized with two white retroreflective stripes. The top stripe shall be 6 in. wide and located 3 to 4 inches from the top of the cone. The second stripe shall be 4 in. wide and located 2 inches below the top band.

**Tall-Weighted Cones.** When specified, tall-weighted cones shall be at least 42 in. high and 7 in. diameter at the inside of the base. Tall-weighted cones shall be manufactured of low density polyethylene (LDPE) and have four high performance wide angle white and orange retroreflective stripes. The stripes shall be horizontal, circumferential and 6 in. wide. Alternate stripe colors with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 1/2 in.

**104.14.03 CONSTRUCTION.**

**ADD:** The following after the first paragraph “The Contractor’s name...away from traffic”.

Equip all cones with approved weights or anchor collars, (15 lb maximum) as needed to maintain an upright position. Anchor collars shall fit to the base of the cone. For tall-weighted cones use anchor collars weighing 10 to 30 lb.



**CATEGORY 100  
PRELIMINARY**

**SECTION 113 — DIGITAL CAMERA**

**113.01 DESCRIPTION.** Furnish a new or like new digital camera with a Color Inkjet Printer for use by Administration personnel. The digital camera and printer shall be delivered to the Engineer at the time of the Notice to Proceed. They shall remain operational and not be returned to the Contractor until final acceptance of the entire project, in conformance with GP-5.13.

**113.02 MATERIALS.**

(a) **Digital Camera.** The digital camera shall meet the following requirements and be furnished with the specified accessories:

- (1) Windows 2000, ME, XP compatible operating system.
- (2) Photo Suite, Photo Deluxe, Picture Works, Photo Shop, or similar Photo Managing Software.
- (3) 4.0 megapixel image resolution (minimum).
- (4) 3X optical zoom (minimum).
- (5) Two (2) sets of rechargeable batteries.
- (6) SmartMedia Card or memory stick (512 MB minimum).
- (7) Pop-up or built-in flash modes.
- (8) All items required for quick downloading.
- (9) Auto-quick focus.
- (10) Lens Cover, Shoulder Strap, and Carrying Case.
- (11) AC adapter and Battery Charger.

(b) **Color Inkjet Printer.** The printer shall conform to the following minimum requirements:

- (1) Resolution of 2400 x 1200 DPI (dots per inch).
- (2) Print speed of 17 PPM (pages per minute) for black and white and 13 PPM for color.
- (3) Memory 8 MB.
- (4) Duty cycle of 5000 pages/month.

Office-jets and Bubble-jets will not be accepted.

**113.03 CONSTRUCTION.** Not applicable.



**113.04 MEASUREMENT AND PAYMENT.** The digital camera will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment for the digital camera will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. If the digital camera or printer becomes defective, is stolen, or for any other reason does not function as intended, it shall be replaced with an approved camera or printer at no additional cost to the Administration. A nonfunctioning or stolen camera or printer shall be replaced within eight hours after the Engineer notifies the Contractor.

Ownership of the camera and printer will remain with the Contractor. The Administration assumes neither responsibility nor liability for the condition of the camera when returned.



**CATEGORY 300  
DRAINAGE**

**SECTION 308 — EROSION AND SEDIMENT CONTROL**

**DELETE:** 308.01.03 Quality Assurance Ratings in its entirety.

**INSERT:** The following.

**308.01.03 Quality Assurance Ratings.** A Quality Assurance Inspector will inspect each project every 2 weeks to ensure compliance with the approved Erosion and Sediment Control Plan. The scores will be reported on Form No. ESC1, Erosion and Sediment Control Field Investigation Report. The Quality Assurance Inspector will use the scores to determine the following ratings:

SCORE	RATING
≥ 90	A
80 - 89.9	B
70 - 79.9	C
60 - 69.9	D
< 60	F

**Rating A.** The project is in compliance. Minor corrective action may be necessary.

**Rating B.** The project is in compliance; however, corrective action is necessary.

**Rating C.** The project is in compliance; however, deficiencies noted require corrections. Shutdown conditions described elsewhere herein could arise quickly. Project will be re-inspected within 72 hours.

**Rating D.** The project is in non-compliance. The Administration will shut down all earthwork operations. All work efforts shall focus on correcting erosion and sediment control deficiencies. The project will be re-inspected within 72 hours. All required corrective actions shall be completed within the 72 hour period for the project to be upgraded to a 'B' rating. Failure to upgrade the project from a 'D' to a 'B' or better rating will result in the project being rated an 'F'. Noncompliance penalty will be imposed for each day the project has a 'D' rating. Refer to Shutdown elsewhere in this Specification for additional requirements.

**Rating F.** The project is in non-compliance. An 'F' rating indicates a score less than 60 or the appropriate permits and approvals have not been obtained; or that the limit of disturbance has been exceeded, or that wetlands, wetland buffers, Waters of the United States (WUS), floodplains, and tree preservation areas as specified in Section 107 have been encroached upon;



or that work is not proceeding according to the approved Erosion and Sediment Control Plan and schedules. The Administration will shut down the entire project until the project receives a 'B' or better rating. All work efforts shall focus on correcting erosion and sediment control deficiencies. Noncompliance penalties will be imposed for each day the project has an 'F' rating.

**Shutdowns.** If a project is rated 'C', correct all deficiencies within 72 hours. The project will be re-inspected at the end of this period. If the deficiencies have not been satisfactorily corrected, the project will be rated 'D' and all earthwork operations will be shut down until the project is rated 'B' or better.

If consecutive 'C' ratings are received, the Contractor will be alerted that their overall effort is marginal and a shut down of all earthwork operations is imminent if erosion and sediment control efforts do not substantially improve within the next 72 hours. The project will be re-inspected at the end of this period. If the deficiencies are not satisfactorily corrected or other deficiencies are identified that result in a score of less than 80 and not below 60 on Form No. ESC1, a 'D' rating will be given and all earthwork operations will be shut down.

If disregard for correcting these deficiencies is evident, an 'F' rating will be given and the entire project will be shut down until the project receives a 'B' or better rating. When degradation to a resource could occur, or if the Contractor is unresponsive, the Administration may elect to have these corrective actions performed by another contractor or by Administration maintenance staff. All costs associated with this work will be billed to the original Contractor in addition to noncompliance penalties.

**Noncompliance Penalty.** Whenever a project is rated 'D' or 'F', the Administration will assess Noncompliance Penalties. Noncompliance Penalties shall be paid within 30 days from the date of notification to the Contractor. Payments will not be allowed to accrue for consideration at final project closeout.

The second time that a project is rated 'F', the Erosion and Sediment Control Training Certificate issued by the State Highway Administration will be immediately revoked from the project superintendent and the Erosion and Sediment Control Manager for at least a six month period and until successful completion of the State Highway Administration's Erosion and Sediment Control Certification Program. Neither the project superintendent nor the Erosion and Sediment Control Manager will be allowed to oversee the installation and maintenance of erosion and sediment controls during the period the certification is revoked on any project of the Authority. Replace the project superintendent and the Erosion and Sediment Control Manager with certified personnel. Work may not commence until the certified personnel are in place.

**308.01.04 Noncompliance Penalty Payments.** For each day that the project has a 'D' rating, the Contractor and/or his surety shall be liable for noncompliance penalties in the amount of \$1,000.00 per day. Failure to upgrade the project to a minimum of a 'B' rating within 72 hours will result in the project being rated 'F'.

For each day that the project has an 'F' rating, the Contractor and/or his surety shall be liable for noncompliance penalties in the amount of \$ 2,000.00 per day.

**308.03 CONSTRUCTION.**

**DELETE:** 308.03.01 Contractor Responsibilities in its entirety.

**INSERT:** The following.

Prior to beginning any earth disturbance activity,

- (a) Determine extent of area only which can be disturbed and stabilized within a complete working day.
- (b) Determine extent of excavation from which the waste material can be disposed properly, or stabilize per approved Erosion and Sediment Control approach, within a complete working day.

Construction activities conducted per day are limited to the extent defined in (a) and (b) above.

**DELETE:** 308.03.02 references to Erosion and Sediment Control Plan (E & S Plan)

**DELETE:** 308.03.04 Schedule in its entirety.

**INSERT:** The following.

Within 14 days after the Notice of Award, submit an Erosion and Sediment Control approach schedule which indicates the sequence of construction, implementation and maintenance controls, temporary and permanent stabilization, and the various stages of earth disturbance. Any changes to the MDE approved Erosion and Sediment Control approach require concurrence from MDE in addition to the Engineer's approval. At a minimum the following shall be included:

- (a) Clearing and grubbing of areas necessary for excavation and construction activities specified in the Contract Documents.
- (b) Implementation of same day stabilization controls specified in the Contract Documents.
- (c) Roadway or other re-grading (including off-site work).
- (d) If applicable, utility installation and whether storm drains will be used or blocked after construction.
- (e) Final grading, landscaping, and stabilization.

Work is prohibited on-site and off-site until the Erosion and Sediment Control schedules and



methods of operation have been accepted by the Engineer and MDE.

**308.03.08 Stabilization Requirements.**

**INSERT:** The following as the last paragraph.

Any disturbed area not draining to an MDE approved sediment trapping device must be stabilized at the end of each working day. Suitable stabilization methods include, but not limited to: Seed and mulch, stone, impervious sheeting properly secured by sandbags or stones.

**308.04 MEASUREMENT AND PAYMENT.**

**DELETE:** 308.04 in its entirety.

**INSERT:** The following.

**308.04 MEASUREMENT AND PAYMENT.** Erosion and Sediment Control, when required by MDE and Engineer, is incidental to the cost of excavation, grading and final stabilization practices. All material, labor, equipment, tools, installation, maintenance, repair, resetting, any temporary stabilization and final removal of all erosion and sediment control devices and shall also be incidental to the cost of excavation, grading and final stabilization practices.

**CATEGORY 800  
TRAFFIC****800-1 CATALOG CUTS AND WORKING DRAWINGS**

**800-1.01 DESCRIPTION.** This work shall consist of the Contractor preparing and transmitting submittals to demonstrate the performance of the work will be in accordance with the Contract Documents. Submittal schedules, catalog cuts, shop drawings, installation methods, manufacturer's certifications, photometric data and working drawings shall be furnished on all Contractor furnished items for highway signing, sign lighting, highway lighting and traffic signals. Stakeouts of the sign locations shall be submitted for all sign structure locations as specified in the Contract Documents.

**800-1.02 MATERIALS.** Not Applicable.

**800-1.03 CONSTRUCTION.**

**Submittal Requirements.** Submittals shall be scheduled and coordinated with the Contractor's construction schedule. A complete submittal schedule and list of required submittals shall be submitted with the first submittal, but no later than three (3) days after the pre-construction conference. The schedule for submission of submittals shall be arranged so that related equipment items are submitted concurrently.

The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment. Shop drawings for closely related items such as a sign and its support structures shall be submitted together.

**Submittal Documents.** Contractor's drawings shall be neat in appearance, legible and explicit to enable proper review to ensure Contract compliance. They shall be complete and detailed to show fabrication, assembly and installation details, wiring and control diagrams, catalog data, pamphlets, descriptive literature, and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine or system provided and its intended manner of use. If the Contractor's drawings deviate from the Contract Documents, the Contractor shall so advise the Engineer in writing with the submittal and state the reason therefore.

No portion of the work requiring a Contractor's drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved Contractor's drawings shall be at the Contractor's risk. The Administration will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.



Maryland  
Transportation  
Authority

## SPECIAL PROVISIONS

Contract No. MA 679-000-002

Page 2 of 5

Shop drawings shall show types, sizes, accessories, layouts including plans, elevations and sectional views, component, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and installed.

In case of fixed mechanical and electrical equipment, layout drawings drawn to scale shall be submitted to show required clearances for operation, maintenance and replacement of parts. Manufacturer's certified performance curves, catalog cuts, pamphlets, descriptive literature, installation and application recommendations, shall be provided and indicate conformance to the Contract Documents. Certifications shall be originals. Certification shall also be sent to the Office of Materials and Technology ("OMT") as required in the Contract Documents.

Manufacturer's catalog, product and equipment data shall be certified and shall include materials type, performance characteristics, voltage, phase, capacity, and similar data along with wiring diagrams when applicable. Indicate catalog, model and serial numbers representing specified equipment. Provide complete component information to verify all specified required items. Installation recommendations and instructions shall provide written Manufacturer's detail step by step preparation and installation of the materials, and products including recommended tolerances and space for maintenance and operation.

Catalog cuts for sign luminaires shall have photometric data attached for each sign to be illuminated. Photometric printouts shall include the sign number, the illumination on a one foot square grid covering the entire sign face, the average illumination, the maximum to minimum uniformity ratio, and a working drawing for the sign face attached.

Catalog cuts for roadway luminaires shall have photometric data attached as specified in the Contract Documents.

The Contractor shall submit working drawings as required for changes, substitutions, contractor design items, and Contractor designed methods of construction. Requirements for working drawings will be listed in appropriate Specification Sections and in Special Provisions. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine or system described and its intended use. Review and approval of such drawings by the Engineer shall not relieve the Contractor from its responsibility with regard to the fulfillment of the terms of the Contract.

Working drawings and calculations as submitted shall be sealed, dated and signed by a Professional Engineer registered in the State of Maryland.

The review and approval of Contractor's drawings by the Administration shall not relieve the Contractor from its responsibility with regard to the fulfillment of the terms of the Contract. The Contractor shall be responsible for the verification and accuracy of all dimensions and insuring that all Contractor furnished items are compatible, and conform to all design and performance criteria.



Maryland  
Transportation  
Authority

All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefrom..

**Submittal Process.** Each Contractor's drawing submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor:

"By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and I have checked and coordinated each item with other applicable approved drawings and Contract requirements."

With the first submittal, submit a Contractor's submittal schedule, listing by Specification Section number, all submittals required and approximate date submittal will be forwarded.

Each submittal having catalog descriptions, shop drawings, working drawings, photometric data, manufacturer's certifications, method of construction and manufacturer's installation recommendations shall be submitted for approval.

Each submittal shall have a transmittal page that indicates the Contractor's and Subcontractor's address and phone numbers. Submittals containing multiple items need the identification only on the exterior of each package. For original submittals, and each subsequent resubmittal that may be required, nine (9) copies will be submitted. A separate copy shall be forwarded to the Engineer.

All submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto:

- (a) Drawing title, drawing number, revision number, and date of drawing and revision.
- (b) Applicable Contract Drawing Numbers and Specification Section and Paragraph Numbers.

The first page of every catalog description, working drawing and material certification shall be stamped in red with the stamp shown in the next page.. All pertinent Contract Document information shall be filled in the spaces provided.



Maryland  
Transportation  
Authority

MARYLAND TRANSPORTATION AUTHORITY	
SUBMITTAL PACKAGE # _____ DATED _____	
CONTRACT # _____ LOCATION _____	
PROJECT DESCRIPTION _____	
ITEM # _____ THIS ITEM CONTAINS _____ PAGES _____	
ITEM DESCRIPTION _____	
<input type="checkbox"/> ACCEPTED	
<input type="checkbox"/> ACCEPTED AS NOTED	
<input type="checkbox"/> REJECTED - REVISE & RESUBMIT	
REVIEWERS NAME _____	DATE _____

The Contractor shall indicate the submittal package by sequential numbering and date of submittal. Catalog, product data or brochure submittals containing various products, sizes and materials shall be underscored or highlighted to indicate the salient features required to meet the specifications. Likewise, items not applicable to the Contract shall be marked "not applicable" or crossed out.

If one or more of the items in a submittal are not approved, resubmittal of only the unapproved items is required, highlighted to show the particular item being resubmitted. Resubmittals shall bear original submittal number and be lettered sequentially.

Three (3) copies of all Contractor's drawings will be returned to the Contractor.

Each submittal shall be in accordance with the Contractor's submission schedule. Allow thirty (30) days for checking and appropriate action by the Engineer.

Contractor's submittals will be returned, marked with one of the following classifications:

ACCEPTED: no corrections, no marks

ACCEPTED AS NOTED: a few minor corrections. Item shall be installed in accordance with the corrected drawings.



Maryland  
Transportation  
Authority

SPECIAL PROVISIONS

Contract No. MA 679-000-002

Page 5 of 5

**REJECTED - REVISE & RESUBMIT:** requires corrections or is otherwise not in accordance with the Contract Documents. No items shall be fabricated. Correct and resubmit drawings as per original submission. Allow thirty (30) days for checking and appropriate action by the Engineer.

**800-1.04 MEASUREMENT AND PAYMENT.** Catalog cuts, manufacturer's certifications, photometric data and working drawings will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents.

**CATEGORY 800  
TRAFFIC****800-2 FIELD EQUIPMENT CABINETS****800-2.01 DESCRIPTION**

This work shall consist of furnishing and installing base or pole mounted field equipment cabinets at locations shown on the Plans. This work shall include all materials, labor, necessary hardware and electrical connections. The contractor will be required to coordinate and schedule with the Authority delivery of the equipment to the site.

All components furnished under this functional specification shall be current production equipment and of recent manufacture. To ensure overall system compatibility, all field equipment cabinets shall be from the same manufacturer.

**800-2.02 MATERIALS**

Electrical/electronic equipment, cabinets, and all component parts shall meet the requirements as specified in Section 820.02 and the standards as set forth in these special provisions:

- 1) Anchor bolts/Bolts/Nuts/Washers
- 2) Cabinets and doors
- 3) Mounting hardware
- 4) Conduit
- 5) Power service conditioning and distribution equipment
- 6) Electrical wires, harnesses and connectors
- 7) Environmental control equipment

**800-2.03 CONSTRUCTION****800-2.03.01 Electronic Equipment**

Any additional electronic equipment (controllers, multiplexers, etc.) to be installed in the field cabinets shall be as specified.

**800-2.03.02 Cabinets - General**

- 1) Serial numbers and model numbers, if available, shall be permanently engraved on all removable components and hardware.



- 2) The serial number and model number shall be etched, stamped, or molded.
  - a. The use of adhesive backed labels is not acceptable.
  - b. Mainframe serial numbers and model numbers shall be readable without disassembly or removal of any part of the cabinet or components located within the cabinet and located on the front face of the mainframe unit.
- 3) All cabinets shall meet or exceed the requirements of a National Electric Manufacturers Association ("NEMA") 3R rating and shall be UL listed.
- 4) All cabinets and doors shall be fabricated from 5052-H32 sheet aluminum alloy with a minimum one eighth of an inch (1/8 in.) thickness.
- 5) All mounting hardware and cabinet bracing shall also be made from aluminum.
- 6) All external welds shall be made using the Tungsten Inert Gas ("TIG") welding method.
- 7) Detailed cabinet drawings and material catalog cuts shall be submitted to the Authority for review and approval prior to ordering cabinets. Drawings shall include, at a minimum, dimensions, equipment placement layout, and cabinet wiring schematics.

#### **800-2.03.03 Cabinets - Electrical**

- 1) All conductor wire runs shall be continuous with no splices.
- 2) All wiring harnesses shall be encased in a continuous sheath. The use of cable ties to arrange wiring harnesses is not acceptable. The use of adhesive backed wire holders is also not acceptable.
- 3) All cabinet back and panel harness wiring shall be soldered at its destination point as specified.
- 4) All conductors shall be labeled. Labels shall be either attached to each end of the conductor and indicate the destination of the other end of the conductor, or shall be a continuous, permanent identification of the conductor's function and located every six inches along the conductor.
- 5) All conductors used in the controller cabinet wiring shall conform to the following color code requirements.
  - a. AC Neutral conductors shall be identified by a continuous white color.
  - b. AC Ground conductors shall be identified by a continuous green color.
  - c. AC Positive conductors shall be identified by a continuous black or red color depending on phase.
  - d. All other conductors shall be identified by any color not previously specified.
- 6) All bolts used for electrical connections shall be fabricated from stainless steel.



- 7) All hardware used for electrical connections and terminal facilities shall be fabricated using cadmium-plated brass.
- 8) All fuse holders shall be of the encased type.
- 9) All switches shall be encased, environmentally sealed, and rated for one hundred and twenty-five percent of capacity. Switches and thermostats shall break the "hot" side of the line.
- 10) All welds shall be neatly formed and free of cracks, blow holes and other irregularities.
- 11) All inside and outside edges of the cabinet shall be free of burrs.
- 12) All access door openings shall have a double flange on all four (4) sides.

#### **800-2.03.04 Cabinets - Mechanical**

##### 1) Size.

All cabinets shall be base or pole mounted NEMA TS-2, size 6. The size 6 cabinets shall be a minimum of fifty-five inches in height by thirty-eight (38) inches in width by twenty-six (26) inches in depth (55 in. H x 38 in. W x 26 in. D). The top of the cabinet shall have a depth of twenty-eight (28) inches to provide the necessary ventilation opening.

##### 2) Equipment Racks.

The Contractor shall furnish and install a removable E.I.A. 19-rack-mount assembly in all NEMA size 6 cabinets furnished and installed under this contract. The rack(s) shall be installed on the left side of the cabinet, facing the door. All power distribution equipment shall be mounted on the right inside wall, opposite the rack assembly. The Contractor shall provide all hardware associated with the mounting of equipment in the rack assembly.

###### a. Features:

- i. Forty-two (42) inches vertical space (24 rack spaces).
- ii. All welded 16 gauge carbon steel tubing construction.
- iii. Four point leveling
- iv. Modular construction
- v. ASA 61 Gray color

###### b. Accessories:

- i. One (1) Patch Panel Frame 48 inch High (Color Gray)
- ii. Two (2) 48-inch, 14-gauge, zinc-plated carbon steel mounting rails



iii. Three (3) sliding, ventilated shelves: gray color.

3) Fan-Forced Ventilation

A thermostatically controlled cooling fan shall be provided for all cabinets.

- a. The fan and thermostat shall be mounted at the top of the cabinet.
- b. The fan and thermostat shall be rated for one hundred and twenty-five percent of capacity.
- c. The thermostat shall be manually adjustable, within a ten degree range, from seventy degrees Fahrenheit to one hundred and sixty degrees Fahrenheit.
- d. The fan bearing mechanism shall be of ball bearing design.
- e. The fan shall have a minimum rated capacity of one hundred cubic feet per minute (100 CFM) air flow.
- f. The fan shall have a minimum rated design life of one hundred thousand hours (100,000 hrs).

4) Natural Ventilation

The cabinets shall be designed for continuous operation over an outside temperature range of -13 degrees Fahrenheit to +113 degrees Fahrenheit (-25° Celsius to +45° Celsius) without requiring fans, in the event the cabinet cooling system fails.

- a. All cabinets shall be provided with louvered vents in the front door with a removable air filter. Louvers shall satisfy the NEMA Rod Entry Test for a 3R rated ventilated enclosure.

Three (3) extra filters shall be supplied for each cabinet installed.

- b. The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.
- c. Exhaust air shall be vented out of the cabinet between the top of cabinet and the main access door.
- d. The exhaust area shall be screened with a material having a maximum hole diameter of one eighth of an inch (1/8").

5) Water Runoff



All cabinets shall have a sloped top surface to prevent the accumulation of water on the cabinet.

6) Finish

All outside surfaces of the cabinets shall have a smooth, uniform, natural aluminum finish.

7) Access Door

All cabinets shall have a single access door located on the front of the cabinet.

- a. The door opening shall be a minimum of eighty percent of the front surface area of the cabinet.
- b. All doors shall be provided with a gasket conforming to the physical properties listing in UL508 Table 21.1 and be such that the gasket forms a weather tight seal between the door and the cabinet.
- c. All doors shall be hinged on the right side as viewed facing the cabinet.
- d. Hinges shall be of a single, continuous design utilizing a fixed hinge pin.
- e. All hinging shall be bolted to the cabinet and door utilizing ¼-20 stainless steel carriage bolts and nylon lock nuts.
- f. All hinge pins shall be capped at the top and bottom by weld to render the pin tamper proof.
- g. All cabinets shall have hinges fabricated from 0.093 inch stainless steel using a 0.250 inch diameter stainless steel hinge pin and shall provide a three (3) inch open width.
- h. All cabinets shall include a door restraint to restrict the door to a maximum one hundred and thirty-five (135) degrees of swing.
- i. The restraint mechanism shall provide latching positions at ninety (90) degrees and at one hundred and thirty-five (135) degrees.
- j. All cabinets shall be equipped with a lock compatible with the State's existing cabinet locks, (dead bolt type) and key hole cover and be keyed for a number 1 key. The Offeror shall provide the State with a minimum of one (1) key each per cabinet.

8) Interior Lighting

A seventy-five watt rough service bulb with a non-corrosive metal cage shall be mounted to the inside top front portion of the cabinet. A door-activated switch shall be installed to turn the cabinet light on



when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

#### 9) Internal Heating

If required, the cabinet may be equipped with a 250 watt resistance type heater. The heating element shall be controlled by a thermostat, the set point of which shall be manually adjustable.

#### 10) Electrical Power

The control cabinet shall be equipped with a metal-encased, split-phase load center, equipped with main breakers rated at 60 amperes for all cabinets.

##### a. Main Breakers

The main breakers shall be double-pole type, so that an overload on either phase will disconnect the entire cabinet from the line.

##### b. Branch Circuit Breakers

All branch circuit breakers shall be molded case single or double-pole, 120/240 volts AC, 10 000-ampere interruption capacity, supplied in a Q.O.U. mounting system. Circuit breakers shall be provided in all panel spaces as follows:

- i. 15-ampere single pole circuit breakers shall be provided for each side of the load center.
- ii. Cabinets shall have one double-pole 40-ampere breaker and four 15-ampere single-pole breakers (two per phase).

##### c. GFI

One convenience Ground Fault Interrupter dual electrical outlet shall be provided on the cabinet power panel. This outlet shall be wired to remain energized at all times.

##### d. Grounding

The cabinet shall be furnished with ground bars, capable of accepting four (4) to fourteen (14) gauge stranded wire, to provide the following:

- i. Two (2) AC to Neutral - Minimum of thirty-six positions.



- ii. Chassis ground - Minimum of eighteen positions.
- e. Wiring Harnesses and Terminals

All wiring harnesses shall be of sufficient length to allow for the placement of the electronic equipment as specified on the Plans.

- i. The cabinet shall be wired to permit the utilization of all of the specified functions and capabilities of all electronic equipment contained therein.
- ii. All back panel or rack wiring is to be complete such that no additional hardware or wiring shall be necessary to utilize all functions of the electronic equipment.
- iii. All terminal facilities shall be readily accessible for field connection without requiring the removal of any of the equipment installed inside the cabinet.
- iv. All wires not utilized shall be terminated and labeled as a terminal strip. The practice of tying back of unused wires is unacceptable.

#### 11) Certification

The following must accompany all electrical and mechanical components supplied:

- a. Instruction manuals.
- b. Maintenance manuals.
- c. Descriptive parts list with industry standard part numbers where applicable.
- d. Three (3) complete sets of wiring and schematic diagrams. Schematics shall include a list of tests points with the following information provided for each point:
  - i. Nominal operating voltage.
  - ii. Wave form and all pertinent information regarding the wave form at each test point.
  - iii. Integrated circuit schematics.
  - iv. Connection and I/O diagrams.

#### **800-2.04 FIELD EQUIPMENT CABINET INSTALLATION**

The Contractor shall install the new base or pole mounted cabinets as shown on the Plans. If an alternate mounting arrangement is required for mounting the new field equipment cabinet, the Contractor shall design and implement an alternative mounting arrangement. Shop drawings detailing



the alternative mounting arrangement shall be submitted by the Contractor to the Authority for approval prior to the installation of the field equipment cabinet. The existing cabinets shall be transported by the Contractor to a storage site, as directed by the Authority.

#### **800-2.05 MEASUREMENT AND PAYMENT**

Furnishing and installing Field Equipment Cabinets will be measured and paid for at the Contract unit price. Work will include all labor, materials, including all lenses, housing, door, gasket, visor, reflector, wiring, and lamp socket complete and operational and incidental connections and testing in order to assure operation, as approved by the Authority, and development of shop drawings as required.

Payment shall be full compensation for all materials, labor, equipment and all other incidentals including removable racks, electronic equipment, including all incidentals necessary to complete the work necessary to complete this work. The Authority will make payment for the following items only upon completion of the installation and commissioning of the Field Equipment Cabinets acceptance by the Authority.

**CATEGORY 800  
TRAFFIC****800-3 SQUARE PERFORATED TUBULAR STEEL POSTS****800-3.01 DESCRIPTION.**

This work shall consist of furnishing and installing Square Perforated Tubular Steel Sign Posts and Square Perforated Tubular Steel Anchor Bases for mounting traffic signs as specified in the Contract Documents, or as directed by the Engineer.

**800-3.02 MATERIALS.**

Steel Posts	A570 Grade 50
Galvanizing	A653 Designation G-90
Spray Galvanizing Compound	A780

Square Tubular Steel Sign Supports and Square Tubular Steel Anchor bases shall be formed from 12 gauge steel. All sides of the tubes shall have 7/16 in. die punched circular holes or perforated knock-outs, at one in. centers along their entire length.

The Tubular Steel Sign Supports shall be two in. square tubes. Maximum 9 Square Feet for single sign support or 18 Square Feet for two sign supports of sign areas with a clearance of 7 ft.-0 in. or less from ground to bottom of sign can be installed.

Square Tubular Steel Anchor Bases shall be comprised of two telescoping tubes. The first shall be 2 ¼ in. square, 3 ft. long, formed from 12 gauge steel and shall snugly fit over the sign support. The second section shall be a 2 ½ in. square, 18 in. long, formed from 12 gauge steel, and shall snugly fit over the 2 ¼ in. section.

**800-3.03 CONSTRUCTION.**

The Square Tubular Steel Anchor Base assembly shall be constructed by placing the 18) in. base section over the 3 ft. base section so that they are flush at the top and the holes are aligned. The entire unit shall be driven into the ground so that one or two rows of holes in the Square Perforated Tubular Steel Base are exposed (maximum 4 in. exposure allowed). The base shall be driven so that it remains plumb and to provide the final sign assembly with the correct orientation.

Finished length of the Tubular Steel Sign Supports shall be determined by adding the total height of the signs to 8 ft, 2 in. The sign support shall be cut to the correct length, and cold spray galvanizing shall be applied to the cut end. The signs shall be bolted to the top of the sign supports, using tamper proof bolts or drive rivets. The Square Tubular Steel Sign Supports shall be lowered 8 in. into the base, and the sign support secured to the base using two corner bolts designed for this purpose.



Maryland  
Transportation  
Authority

## SPECIAL PROVISIONS

Contract No. MA 679-000-002

**Page 2 of 2**

**800-3.04 MEASUREMENT AND PAYMENT.** Square Perforated Tubular Steel Sign Posts will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the sign support, corner bolts, and painting as required, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Square Tubular Steel Anchor bases will be measured and paid for at the contract unit price per each. The payment will be full compensation for both tubes comprising the base section, all excavation, anchor bases, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.



**CATEGORY 800  
TRAFFIC**

**800-4 SIGN INSTALLATION DATE STICKERS**

**800-4.01 DESCRIPTION.** This work shall consist of furnishing and installing a sign installation date sticker to identify the date of installation for every proposed sign.

**800-4.02 MATERIALS.** The sign installation date sticker shall be a self-adhesive label which displays the year and month (see example below), and would allow the sign installer to hole-punch the month, to indicate date of installation. The sign installation date sticker shall be provided by the sign sheeting manufacturer. The sticker shall be a minimum size of 2inch wide by 1inch high, and shall not exceed 8inch wide by 4inch high.

**800-4.03 CONSTRUCTION.** The sign installation date sticker shall be installed, on the date of installation on the lower reverse corner of the sign, closest to traffic. The sign installation date sticker shall be directly applied to the aluminum sign as per the manufacturer's specifications. The Contractor shall prepare the surface as required by the manufacturer's specifications.

**800-4.04 MEASUREMENT AND PAYMENT.** Sign Installation Date Sticker will not be measured but the cost will be incidental to the appropriate furnish and install sheet aluminum and extruded aluminum signs items in the contract. The payment will be full compensation for all materials, labor, equipment, tools and incidentals necessary to complete the work.

1	2	3	4	5	6
<b>2009</b>					
7	8	9	10	11	12

Note: Numbers shown for display purposes only.

**CATEGORY 800  
TRAFFIC****800-5 INSTALLATION OF DYNAMIC MESSAGE SIGNS AND CONTROLLERS**

This work shall consist of installing the Dynamic Message Signs (DMS) and Controllers at locations shown on the plans. This equipment has been purchased by the Authority under separate contract and will be provided to the contractor as required. The contractor will be required to coordinate and schedule ordering of the equipment with the Authority. There is a minimum 6 month lead time for delivery of the equipment to the site after placement of order. The Contractor must have all DMS and Controller equipment orders submitted to the Authority by February 5, 2011. The contractor will be responsible for coordinating and working with the DMS Manufacturer (Daktronics, Inc.) representative during the installation of the DMS and controllers.

**800-5.01 GENERAL REQUIREMENTS**

This item consists of installing new Dynamic Message Signs and Sign Controllers and replacing existing DMS and controllers, respectively, in accordance with the Plans and Special Provisions, or as directed by the Engineer. The DMS and Controllers shall operate as part of an integrated Traffic Control System, including the central system, new communications network, and field cabinets.

The DMS Manufacturer will be responsible for providing the following:

- Supplying the Dynamic Message Sign (ready for installation)
- Supplying the DMS Controller with appropriate software/firmware
- Supplying the communications cable from the controller cabinet to the DMS (The DMS Manufacturer shall supply up to 150 feet of fiber optic cabling for controller to DMS communications).
- Providing the final connections and testing of communications cable.
- Supplying the structural sign frames for the connection of static signs to the DMS. The DMS manufacturer shall supply the static sign frames assembled but not mounted to the DMS.

The Contractor will be responsible for providing the following:



- Providing all information necessary for the DMS order 6 months prior to the date when the DMS is needed on site. The information shall include but not be limited to contact information for the contractor's representative responsible for site delivery coordination,
- the location within Maryland to which the DMS shall be delivered, the DMS number or other plan reference, the proposed delivery date to the site, and a signed order form. The delivery date may not be delayed more than 30 calendar days from the originally proposed delivery date.
- Providing a final delivery date 30 days prior to the originally proposed delivery date and arranging to take possession of the DMS on the final delivery date. The final delivery date may be up to 30 days after the originally proposed date. Once the final delivery date is set, it may not be changed. If the contractor does not provide a final delivery date, the DMS will be delivered on the originally proposed date and the contractor MUST arrange to take possession and store the DMS.
- Delivering any existing DMS and controllers that are noted as "to be salvaged" on the plans to a designated storage area to be determined by the Authority. Existing DMS that are not intended for salvage shall be disposed of by the contractor.
- Mounting the static signs on the static sign frames and mounting the assembled frame and static sign on the DMS, for DMS signs that include static sign messages.
- Installing the new DMS (excluding only work items identified above for DMS manufacturer)
- Arranging reasonable access to the delivered signs for final assembly of miscellaneous items such as visors and static sign frames, by the DMS supplier, when the DMS is delivered.
- Installing and terminating the communications cable (fiber optic cable provided by DMS manufacturer) into the conduits. The cable shall run from the controller location to the DMS communications connection within the DMS.
- Furnishing and Installing all power cables from the controller cabinet to the DMS.
- Salvaging and turning over to the State the modems or telephone equipment contained within the existing enclosures.
-



- Installation of (2) 1 1/2" Galvanized conduits for power and communications from the controller cabinet to the DMS housing for power and communications cabling. The conduit containing the power conductors shall also have a separate ground wire installed and sized per the NEC.
- Grounding the DMS and traffic cabinet shall be grounded according to the provision outlined in Articles 250 and 600 of the National Electrical Code with the exception that the ground shall not exceed 10 ohms. Verify and measure the ground system resistance to ensure that it is 10 Ohms or less for the earth ground to be used for the DMS. In the event that the earth ground is not adequate, present or in excess of 10 Ohms, the Contractor shall install an earth ground system to meet the noted requirements. Additionally, a separate ground wire shall be installed from the DMS to a ground rod and shall present a maximum resistance of 10 ohms to ground.
- Supplying all power wiring for the DMS and associated traffic cabinet installation. All wiring for AC Conductors shall be sized appropriately per the NEC and shall have insulation rated as
- THHN as a minimum. Neutral conductors shall be 200% rated. Feeder breaker for DMS and wire sizes shall be as specified below.

Sign type	Maximum Power Draw	Minimum Breaker size
1	35	2P50
1 Modified	30	2P40
2	25	2P40
3 modified A, B, C, D, or E	30	2P40
5	40	2P60
6	40	2P60

Breaker Size	#8AWG	#6AWG	#4AWG	#2AWG	#1AWG
40A	Up to 163ft	Up to 254ft	Up to 391ft	Up to 617ft	Up to 757ft
50A	Not allowed	Up to 203ft	Up to 313ft	Up to 493ft	Up to 606ft
60A	Not allowed	Not Allowed	Up to 261ft	Up to 411ft	Up to 505ft

- Supplying fiber optic communications cable per the DMS supplier's specification if the cable distance from the controller to the DMS exceeds 150'. The DMS manufacturer provides only 150' of fiber optic cable.
- Connection of the utility power from the utility demarcation to the DMS and/or traffic cabinet. The Contractor shall provide all conduit required for the DMS and traffic



cabinet installation. Conduit that is exposed shall be galvanized rigid steel and shall be sized to meet the DMS requirements.

- All coordination with Authority and DMS Manufacturer, including any necessary maintenance of traffic required for commissioning and testing by the DMS Manufacturer.
- The contractor will be required to provide a bucket truck for use by the commissioning contractor during the DMS commissioning and testing.

#### **800-5.02 DYNAMIC MESSAGE SIGN INSTALLATION**

The Contractor shall install new Dynamic Message Sign on proposed overhead, cantilever, or pedestal sign structure. The DMS Manufacturer will provide horizontal Z-bar mounting hardware mounted to the DMS sign, and vertical W4x13 members for connection to the overhead/cantilever sign structure. The contractor shall be responsible for field drilling the holes in both the horizontal Z-bar and vertical W4x13 members, and making connections of these members with hardware supplied by DMS Manufacturer. Contractor shall supply 3M™ Polyethylene Protective Tape 8179, or approved equal, to place between horizontal Z-bar and vertical W4x13 members. Contractor shall be responsible for supplying u-bolts and all hardware to connect the vertical W4x13 to the overhead/cantilever sign structure, and making these final connections. The contractor shall notify the Authority seven days in advance of the installation.

No DMS's shall be installed until power and communication systems have been installed to the control cabinet, inspected and approved. Commissioning of the DMS shall be completed within two (2) weeks of installation.

#### **800-5.03 ELECTRICAL DISTRIBUTION**

The power distribution shall be through a panel board with overload protection consisting of thermal magnetic circuit breakers. Power shall be supplied through the ground mounted control cabinet utilizing 15 and 20 amp branch circuits to connect devices within the cabinet. The DMS is powered by a breaker and feeder as described above. Contractor shall uncover the grounding electrode to allow the DMS Manufacturer to test the grounding of the DMS and structure at the time of commissioning.

Within the traffic control cabinet the Contractor shall ensure that a minimum of two GFCI outlets are installed on a single electrical circuit.



Within the DMS, the following minimum loads shall be identified and provided by an electrical panel that was furnished and installed by the DMS supplier as part of the construction of the DMS. The contractor shall connect the feeder coming from the ground mounted control cabinet to the electrical panel within the DMS to complete the electrical distribution system.

- 1) Heating loads shall be on separate circuits.
- 2) The ventilation system shall be on separate circuits.
- 3) The DMS power supplies shall have dedicated circuits.
- 4) Any communications devices, interface boards, or other microprocessor-controlled devices shall have a dedicated circuit.
- 5) A circuit shall be provided for sign convenience outlets.
- 6) A circuit shall be provided for interior lighting, and other miscellaneous devices.

All panels shall have 200% neutral busses due to the heavy use of switching power supplies common to the DMS design. The neutral conductor from the ground-mounted cabinet to sign shall be 200% rated. A cover plate shall be provided and installed on panel boards. It shall not be possible to make inadvertent contact with the bus bars. All circuits must be labeled and the phases of the electrical circuit shall be balanced. Devices that introduce harmonic distortion or sudden load changes shall be located on one phase and microprocessor-controlled devices on the other phase of the 240V/120V circuit.

#### **800-5.04 MEASUREMENT AND PAYMENT**

Installation of Dynamic Message Signs Types I and Modified Type III with Integrated Controllers will be measured per each. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work. The Authority will make payment for the above items only upon completion of the installation, commissioning and testing of the DMS and acceptance by the Authority.

Payment for furnishing and installing other items associated with this work including static sign panels, sign structure, catwalks, spacer frames, hardware and maintenance of traffic will be measured and paid under the pertinent bid items in the contract.



**CATEGORY 800  
TRAFFIC**

**800-6 UTILITY CONNECTIONS AND UTILITY STAKEOUT**

**800-6.01 DESCRIPTION.** This work shall consist of utility connections, and utility stakeout, as specified in the Contract Documents or as directed by the Engineer.

This work shall consist of contacting Miss Utility as required by Law and providing evidence of Miss Utility Marking of the construction area.

This work shall include written notification to the Maryland Transportation Authority at least 72 hours in advance of excavation for each site.

**800-6.02 MATERIALS.**

Disconnect Switches and Utility Connections      950.13.10

**800-6.03 CONSTRUCTION.** The Contractor shall arrange a meeting with the utility company representatives, the Engineer and the District Utility Engineer as specified in the Contract Documents to establish a schedule for utility connections before any equipment or material is installed.

The Contractor shall not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of a utility company's facilities. The Contractor shall be responsible for the utility service connections to the utility company's supplied point of service.

The Contractor shall make the necessary arrangements with the utility companies to insure having needed utilities available at the time of turn on. Any utility energization, connection or disconnection delays will not be considered a valid reason for any work time extension claim. Difficulties in securing utility company services are to be reported to the Engineer at the earliest possible time.

**Utility Stakeout.** The Contractor shall contact Miss Utility and assure that all construction areas are marked where excavation will take place. The Contractor shall maintain the markings. The Contractor shall pay any Miss Utility fees. The Contractor shall submit copies of Miss Utility tickets to the Engineer as evidence of this work.

The Contractor shall provide a written notification of intent to excavate an area to the Maryland Transportation Authority at least 72 hours in advance of such activity. The Maryland



Transportation Authority is not a subscriber to utility marking services. This notification shall permit the Authority to mark any utilities within the excavation area.

The written notification shall be provided to the Authority's Project Manager and a copy provided to the Administrator at the affected facility as indicated below:

Dave Roehmer, FMT	410-537-1250	410-537-1207
-------------------	--------------	--------------

In addition to the above, for work on SHA right of way the Contractor shall notify the appropriate agencies listed in the Contract Documents, and those listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Contractor's anticipated beginning of any underground work.

- a) Request the Statewide Operations Center (800-543-2515) to stake out SHA fiberoptic and communication cables.
- b) Request the Communications Division (410-747-8590) to stake out ITS devices.
- c) Request the ITS operations section (410-787-7662) to stake out ITS devices.

The Contractor shall plan the work to minimize interference with any existing traffic control devices.

The contractor shall maintain markings of utilities until excavation work is complete.

Existing equipment shall remain in its original condition until the new equipment has been completed, satisfactorily tested and its operation accepted by the Engineer.

**800-6.04 MEASUREMENT AND PAYMENT. Utility Connection.** Utility Service Equipment connections will be measured and paid for as specified in 807.04.01.

All utility company energization, connection or disconnection costs will be the responsibility of the Administration.

**Utility Stakeout.** Utility Stakeout will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

**CATEGORY 800  
TRAFFIC****SECTION 800-7 - DYNAMIC MESSAGE SIGN - ISDN COMMUNICATIONS**

**800.7.01 DESCRIPTION.** This work consists of coordinating, obtaining, connecting and maintaining ISDN telephone service Dynamic Message Signs (DMS's) indicated on the Plans. The communication line shall allow MdTA's Authority Operations Center (AOC) and Maryland's SHA's Emergency Operations Centers (SOC) to communicate with and control the DMS's. The integration of the signs into the control systems will be done by others and is not part of this contract.

**800-7.02 MATERIALS.** Not applicable.

**800-7.03 CONSTRUCTION.** The Contractor shall coordinate with the local telephone provider (Verizon) to obtain dedicated ISDN telephone lines to the DMS equipment cabinets; one line per cabinet, as shown on the plans. The Contractor shall be responsible for all charges for the application of services, charges to install service, and monthly recurring costs until the Contract is complete.

The Contractor must provide the access numbers and other configuration information necessary for the Maryland Agencies to configure the Operations System to communicate with the DMS via the ISDN service.

The service accounts shall be transferred to the MdTA upon final approval of the DMS system.

**800-7.04 MEASUREMENT AND PAYMENT.** ISDN Service shall be paid per each complete service connection based on actual invoiced amounts from the service provider (Verizon). Profit, overhead, or any other additional charges or fees above and beyond those assessed by the ISDN provider are not to be included in this item. The price shall include coordinating with the local telephone provider for service for each DMS equipment cabinet, connecting the lines to the communications terminals and control equipment, and final testing the connections. An allowance of \$50,000.00 has been budgeted in the Schedule of Prices. The monthly service charges shall be paid separately.

Monthly ISDN Service Charges shall be paid per month of service per each ISDN service. Payment will be based on the actual invoiced amounts from the ISDN provider. The Contractor shall submit copies of the invoices and proof of payment to the Engineer for reimbursement. Profit, overhead, or any other additional charges or fees above and beyond those assessed by the ISDN provider are not to be included in this item. An allowance of \$40,000.00 has been budgeted in the Schedule of Prices.



**CATEGORY 800  
TRAFFIC**

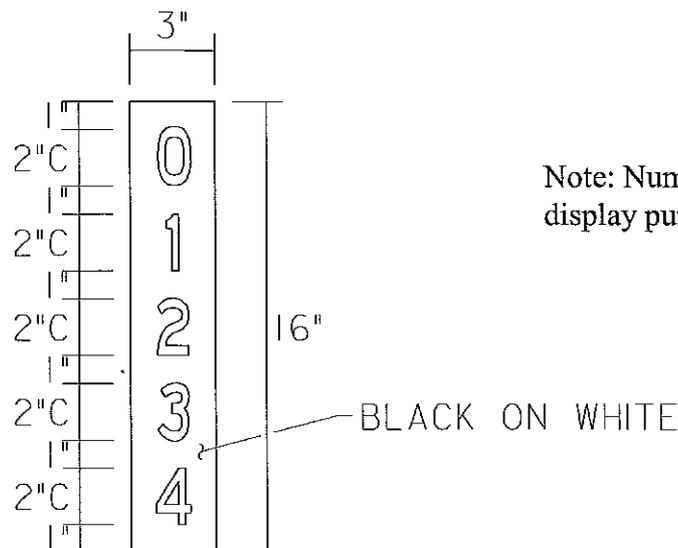
**800-8 SIGN STRUCTURE IDENTIFICATION NUMBER LABEL**

**800-8.01 DESCRIPTION.** This work shall consist of furnishing and installing a Sign Structure Identification Number Label on all Authority owned sign structures (overhead and cantilver) within the limits of the project. The Contractor shall contact the Authority's Bridge Engineer to coordinate identification numbers for each sign structure that are owned and maintained by the Authority as detailed on the Plans. Sign structures not owned and maintained by the Authority, as detailed on the plans, will not require labels.

**800-8.02 MATERIALS.** Sign Structure Identification Number Labels shall be fabricated of the same sheeting material for other signs in the contract as specified on Drawing No. SN-1. Reflective Sheeting per 950.03.

**800-8.03 CONSTRUCTION.** The Sign Structure Identification Number Label shall be installed perpendicular to traffic, at 7'-0" from top of roadway to bottom of Identification Number. The sheeting only shall be directly applied to the sign structure as per the manufacturer's specifications. The Contractor shall prepare the surface as required by the manufacturer's specifications.

**800-8.04 MEASUREMENT AND PAYMENT.** Sign Structure Identification Number Labels will not be measured but the cost will be incidental to the appropriate furnish and install sign structure items in the Contract. For existing sign structures, the costs will be incidental to other pertinent items in the Contract. The payment will be full compensation for all materials, labor, equipment, tools and incidentals necessary to complete the work.





**CATEGORY 800  
TRAFFIC**

**SECTION 803-OVERHEAD SIGN STRUCTURES**

**803.03 CONSTRUCTION.**

Add the following;

At least 48 hours after the sign structure is completely constructed/installed, including all the signs per contract requirements, the Contractor shall return to the structure, inspect all anchor bolts & nuts, and, if necessary, retighten the anchor bolts and nuts per the specifications. All costs related to this shall be part of the pertinent sign structure bid item.

**CATEGORY 800  
TRAFFIC****SECTION 809 — TRENCHING AND BACKFILLING**

635 **ADD:** the following paragraphs before the "Cable Treatment" paragraph:

**"Miss Utility"**. Where trenching and backfilling for the placement of conduits, splice boxes, handholes and handboxes is required, the contractor must contact "Miss Utility". "Miss Utility" shall be notified 48 hours in advance of any work under the contract and test pit all marked locations for exact position of cables, conduits, and other underground utilities.

**Depth.** Unless otherwise specified on the contract drawings, trenches shall be excavated to a depth such that all conduits, wires, and duct cable in trench is at a finished elevation at least 24" below the final grade. Where trenches are placed on slopes, cover shall be measured from the outside jacket of the duct cable or conduit to the nearest top of grade. This measurement will generally be perpendicular to the slope of the grade.

Where proper trench depth cannot be obtained, and improper depth presents a hazard to the cables, or conduit, the Engineer may direct that lengths of 4" galvanized rigid steel conduit be installed as a sleeve. The sleeve length shall be in intervals of 10'. The contractor must bend conduit to conform to the line and grade of the trench. Additionally, the Engineer may require concrete cover in shallow trench, on slopes, or where other conditions indicate the need.

**Width.** Unless otherwise specified on the contract drawings, trenches shall be excavated to a width such that all conduits, wires, and duct cables in the trench are placed with at least 3" of backfilled material between the outside edge of the conduits, wires, and duct cables and undisturbed earth.

**Stake Out.** Stake out trenches prior to trenching and review the exact placement with the Engineer. Generally, keep trenches at least 3' behind guardrail and curb, and out of drainage ditches, gutters, culverts etc.. Run trenches in as straight a line as possible and parallel to the nearest roadway.

**Guardrail.** Where guardrail is to be placed, reset, removed, or otherwise worked in any manner, that tends to disturb the earth, place conduits and wiring only after such work is complete so as to avoid damage to the electrical work by the guardrail work.



**Curb and Gutter.** Where curb or gutter work is to be done in close proximity to electrical work, perform the work in the order and fashion necessary to minimize the risk of damaging either of the two types of works.

**Unsuitable Materials in Trench.** Remove any objects or projections into a trench, which may damage the wire or cable duct. These may include rocks, debris, glass, old cables, concrete, etc. Alternatively, provide a galvanized rigid steel sleeve with grommets where projections into the trench cannot be removed.

**Restoration.** Backfill trench and tamp to achieve compaction. Seed, mulch and stabilize earth such that area is restored to previous conditions.



**CATEGORY 800  
TRAFFIC**

**SECTION 822-REMOVE AND RELOCATE  
EXISTING SIGNS AND SIGN STRUCTURES**

**DELETE:** 822.04.02 in its entirety

**INSERT:** The following:

**822.04.02** Remove Signs from Existing Overhead Structure will be measured and paid for at the Contract unit price per square foot area of the sign. Removal of sign and sign luminaire supports, luminaries, catwalks, conduit and cable will not be measured but the cost will be incidental to the Contract unit price for removing the signs.



**CATEGORY 800  
TRAFFIC**

**830 COMMON WORK RESULTS FOR ELECTRICAL**

**830.01.01 RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**830.01.02 SUMMARY**

Section Includes:

Electrical equipment coordination and installation.

Common electrical installation requirements.

**830.01.03 COORDINATION**

Coordinate arrangement, mounting, and support of electrical equipment.

Allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

Provide for ease of disconnecting the equipment with minimum interference to other installations.

Allow right of way for piping and conduit installed at required slope.

Connect raceways, cables, wireways, cable trays, and busways so that will be clear of obstructions and of the working and access space of other equipment.

**830.02 EXECUTION**

**830.02.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION**

Comply with NECA 1.

Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

**Headroom Maintenance:** If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

**Equipment:** Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.



**CATEGORY 800  
TRAFFIC**

**832 - ELECTRICAL IDENTIFICATION**

**832.01 GENERAL**

**832.01.01 RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**832.01.02 SUMMARY**

This Section includes the following:

- a) Identification for raceway.
- b) Identification for conductors and control cable.
- c) Warning labels and signs.
- d) Equipment identification labels.

**832.01.03 SUBMITTALS**

Product Data: For each electrical identification product indicated.

**832.01.04 QUALITY ASSURANCE**

Comply with ANSI A13.1 and ANSI C2.

Comply with NFPA 70.

Comply with 29 CFR 1910.145.

**832.01.05 COORDINATION**

Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

Coordinate installation of identifying devices with location of access panels and doors.



**CATEGORY 900  
MATERIALS**

665 **DELETE:** SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS in its entirety.

**INSERT:** The following.

**SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS**

**902.01 STORAGE.** Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

**902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT.** The manufacturer shall furnish certification as specified in TC-1.02. The certification shall also include:

- (a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.
- (b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.
- (c) Records of data accumulated by the quality control procedures shall be produced upon request.
- (d) A certified document shall accompany each shipment stating that the contents conform to all applicable requirements. Additionally, the document shall show the producer's name, mill location, carrier number, date loaded, weight contained in carrier, silo number, consignee, destination, Contract number, and type of cement. The signature and title of the signer shall be shown on the document.
- (e) The mill shall, upon request, supply certified chemical and physical test values that can be associated with any sample representing cement drawn from a particular silo on a given date.
- (f) Acceptance of cement by certification will be terminated if test results differ from mill results by more than the precision limits given in the test method. The acceptance procedure will then revert to storage testing and approval prior to shipment.

**902.03 HYDRAULIC CEMENT.**

**902.03.01 Portland Cement.** M 85, with the fineness and the time of setting determined using T 153 and T 131, respectively.



**902.03.02 Ground Iron Blast Furnace Slag.** M 302, Grade 100 or 120. The Contractor may request to substitute a maximum of 50 percent of the weight of cement with ground iron blast furnace slag. When ground iron blast furnace slag is used, the minimum cement factor and water/cement ratio will be determined on the basis of the combined weight of the portland cement and ground iron blast furnace slag. When ground iron blast furnace slag is used to control alkali silica reactivity, see Table 902 B for percentage.

**902.04 BLENDED HYDRAULIC CEMENT.** M 240, Type I (PM) or a Type IP containing 15 to 25 percent pozzolan by weight of cement. Maximum loss on ignition is 3.0 percent. Do not use ground iron blast furnace slag for blending. The requirement for a manufacturer's written statement of the chemical composition is waived.

**902.05 MASONRY CEMENT.** C 91, except the water retention and staining tests are waived.

**902.06 CONCRETE ADMIXTURES.** Do not use concrete admixtures that contribute more than 200 ppm of chlorides based on the cement content when tested per MSMT 610. Use only prequalified admixtures.

Do not use pozzolan and Type I (PM) or Type IP cement in the same mix. Since the strength gains are delayed with these materials, a longer period of time may be required for curing and form removal.

**902.06.01 Air Entraining Admixtures.** M 154.

**902.06.02 Chemical Admixtures.** M 194, Type A, D, or nonchloride C.

**902.06.03 High Range Water Reducing Admixtures.** M 194, except that it shall be a liquid, the water content shall be a maximum of 85 percent of that of the control, and the durability factor shall be a minimum of 90. Use Type F for early strength, which shall produce a minimum compressive strength in 12 hours of 180 percent of that of the control. Use Type G when early strength is not specified. The manufacturer shall furnish certification as specified in TC-1.02. The certification shall include curves indicating the fluid ounces of admixture per 100 lb of cement as related to water reduction and strength gain for 12 hours when used with a minimum cement factor of 700 lb.

**902.06.04 Pozzolans.** The use of pozzolans may be requested to control alkali silica reactivity or for other reasons. When a pozzolan is used, determine the minimum cement factor and water/cement ratio on the basis of the combined weight cement and pozzolan. See Table 902 B for percentage of fly ash, and microsilica.

(a) **Fly Ash.** M 295, pozzolan Class C or F, except that the maximum permissible moisture content shall be 1.0 percent, and when used in concrete Mix Nos. 3 and 6 the maximum loss on ignition 3.0 percent.

(b) **Microsilica.** C 1240, except that the oversize requirement is waived.



**902.06.05 Corrosion Inhibitors.** Corrosion inhibitors shall be calcium nitrite based and contain a minimum of 30 percent active ingredients by mass. The gallonage of corrosion inhibitor used in the concrete mixture shall be included as water when determining the water/cementitious materials ratio.

**902.07 PORTLAND CEMENT CONCRETE CURING MATERIALS.** Use burlap cloth, sheet materials, liquid membrane forming compounds, or cotton mats.

**902.07.01 Burlap.** M 182, Class 1, 2, or 3.

**902.07.02 Sheet Materials.** M 171 with the following exceptions:

- (a) **White Opaque Burlap Polyethylene Sheeting.** Tensile strength and elongation requirements are waived. Use sheeting having a finished product weight of not less than 10 oz/yd<sup>2</sup>.
- (b) **White Opaque Polyethylene Backed Nonwoven Fabric.** 902.07.02(a), with the thickness requirement waived. Use material having a finished product weight of not less than 5 oz/yd<sup>2</sup>.
- (c) **White Opaque Polyethylene Film.** Tensile strength and elongation requirements are waived.

**902.07.03 Liquid Membrane.** M 148. Field control testing of the white pigmented curing compounds is on the basis of weight per gallon. The samples shall not deviate more than  $\pm 0.3$  lb/gal from the original source sample.

**902.07.04 Cotton Mats.** Cotton mats consist of a filling material of cotton bats or bats covered with unsized cloth and tufted or stitched to maintain the shape and stability of the unit under job conditions of handling.

Use coverings of either cotton cloth, burlap or jute having the following properties:

- (a) Cotton cloth covering shall weigh not less than 6.0 oz/yd<sup>2</sup> and have an average of not less than 32 threads/in. of warp and not less than 28 threads/in. of filling. Use raw cotton, cotton comber waste, cotton card strip waste, or combinations thereof as the raw material used in the manufacture of the cotton cloth.
- (b) Burlap or jute covering for cotton mats shall weigh not less than 6.4 oz/yd<sup>2</sup> and shall have not less than 8 threads/in. of warp and not less than 8 threads/in. of filling. Use the grade known commercially as "firsts" and they shall be free from avoidable imperfections in manufacture and from defects or blemishes affecting the serviceability.

Use a cotton bat, or bats made of raw cotton, cotton waste, cotton linters, or combinations thereof, as the filling material for the mats. Mats shall weigh not less than 12 oz/yd<sup>2</sup>.



**902.08 FORM RELEASE COMPOUNDS.** Use form release compounds that effectively prevent the bond of the concrete to the forms. Form release compounds shall not cause discoloration of the concrete or adversely affect the quality or rate of hardening at the interface of the forms.

The flash point of the form release compound shall not be less than 100 F when tested per T 73.

**902.09 PARAFFIN WAX.** Use clear paraffin wax for use as a bond breaker for concrete. The flash point shall not be less than 380 F when tested under D 92.

**902.10 PORTLAND CEMENT CONCRETE.** Section 915 and as specified herein.

**902.10.01 Proportioning.** Prior to the start of construction, submit to the AME the source and proportions of materials to be used for each concrete mix. The mixture shall meet 902.10.03.

The concrete, with the exception of water and chemical admixtures, shall be proportioned by weight. Water and chemical admixtures may be proportioned by volume or weight. The mix shall be uniform and workable.

**902.10.02 Materials.**

Coarse Aggregate	901.01
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Synthetic Fibers	902.15
Water	921.01

**902.10.03 Portland Cement Concrete Mixtures.**



The concrete mixes shall conform to the following:

**TABLE 902 A**

PORTLAND CEMENT CONCRETE MIXTURES									
MIX NO.	28 DAY SPECIFIED COMPRESSIVE STRENGTH	STANDARD DEVIATION	CRITICAL VALUE	MIN CEMENT FACTOR	COARSE AGGREGATE SIZE	MAX WATER/CEMENT RATIO	SLUMP RANGE	TOTAL AIR CONTENT	CONCRETE TEMPERATURE
	psi	psi	psi	lb/yd <sup>3</sup>	M 43 / M 195	by wt	in.	%	F
1	2500	375	2430	455	57, 67	0.55	2 – 5	5 – 8	70 ± 20
2	3000	450	3010	530	57, 67	0.50	2 – 5	5 – 8	70 ± 20
3	3500	525	3600	580	57, 67	0.50	2 – 5	5 – 8	70 ± 20
4	3500	525	3600	615	57, 67	0.55	4 – 8	N/A	70 ± 20
5	3500	525	3600	580	7	0.50	2 – 5	5 – 8	70 ± 20
6	4500	675	4770	615	57, 67	0.45	2 – 5	5 – 8	65 ± 15
7	4200	630	4420	580	57	0.50	1½ – 3	5 – 8	70 ± 20
8	4000	600	4180	750	7	0.42	2 – 5	5 – 8	65 ± 15
9	3000 (a)	N/A	N/A	800	57, 67	0.45	4 – 8	5 – 8	70 ± 20
10	4500	675	4770	700	¾" – No. 4	0.45	2 – 5	6 – 9	65 ± 15
11	4200	630	4420	—	57, 67	0.45	2 – 5	5 – 8	65 ± 15
12	4200	630	4420	—	¾" – No. 4	0.45	2 – 5	6 – 9	65 ± 15

Note 1: When concrete is exposed to water exceeding 15,000 ppm sodium chloride content, Type II cement shall be used. In lieu of Type II cement, a Type I cement may be used in combined form with an amount of up to 50 percent replacement with ground iron blast furnace slag, or an amount of up to 25 percent replacement with Class F fly ash. The Contractor shall submit to the Engineer the proposed mix proportions and satisfactory test results per C 1012 showing a sulfate resistance expansion not exceeding 0.10 percent at 180 days

Note 2: The temperature of Mix No. 6 when used for other than superstructure work as defined in TC-1.02 shall be 70 ± 20 F.

Note 3: Type A or D admixture shall be added to bridge, box culvert, and retaining wall concrete.

Note 4: Nonchloride Type C admixtures may be used when approved by the Engineer.

Note 5: Other Slump Requirements:

When a high range water reducing admixture Type F or Type G is specified, the slump shall be 4 to 8 in.

When synthetic fibers are specified, the slump shall be 5 in. maximum.

When concrete is to be placed by the slip form method, the slump shall be 2-1/2 in. maximum.

When the absorption of the coarse aggregate is greater than 10 percent, the slump shall be 3 in. maximum.

Note 6: Mix 9 shall contain a Type F high range water reducing admixture.

Note 7: Mix 10 and 12 shall be proportioned as specified in 211.2 of the ACI's Recommended Practices for Selection

Proportions for. Structural Lightweight Concrete. The maximum average Density of Cured Concrete shall be 118 lb/ft<sup>3</sup>.

Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd<sup>3</sup>, or fraction thereof, as specified in M 195.

Note 8: Mix 11 and 12 shall also conform to all requirements as specified in Table 902 C.

(a) Acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours. Design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 12 hours. Testing shall conform to 902.10.08 except that cylinders shall remain in the molds until tests are conducted.

Coarse and fine aggregate having an expansion up to 0.10 percent when tested for alkali silica reactivity (ASR) MSMT 212 may be used without restriction. Aggregates having an expansion greater than 0.10 but less than 0.35 percent are considered reactive and may only be used when one of the options in table 902 B are employed. Those having an expansion of 0.35 percent and greater are prohibited.



**TABLE 902 B**

OPTION	ALKALI CONTENT OF CEMENT % max	REPLACE CEMENT WITH		SPECIFICATION
		MATERIAL	% BY WEIGHT	
1	1.50	Class F Fly Ash	15 – 25	M 295
2	1.50	Ground Iron Blast Furnace Slag	25 – 50	M 302 Grade 100 or 120
3	1.50	Microsilica	5 – 7	C 1240
4	—	Blended Cement (a)	100	M 240
5	0.60 (b)	Low Alkali Cement	100	M 85

(a) Pozzolan content of 15 – 25 percent by weight of cement

(b) For mix 9 used for Portland cement concrete pavement repairs; the maximum allowable percentage of alkalis in Portland cement shall be 0.70.

When reactive aggregate is used, designate which option will be used to control the formation of the ASR gel. If an option other than option 5 in Table 902 B above is chosen, conduct tests per MSMT 212 using the reactive aggregate and the proposed cementitious material. The expansion test results shall not be greater than 0.10 percent. When more than one reactive aggregate is used in a concrete mix, each shall be tested individually and the maximum amount of pozzolan required to reduce the expansion of all the aggregates to 0.10 percent or less shall be used. Submit the aggregate source, test results, and the percent and type of replacement cement to the Engineer. The Engineer may withhold source approval pending verification testing.



**TABLE 902 C**

<b>MIX PHYSICAL PROPERTIES</b>		
<b>TEST PROPERTY</b>	<b>TEST METHOD</b>	<b>SPECIFICATION LIMITS</b>
Minimum Cementitious Materials Factor, lb/yd <sup>3</sup>	—	580
Maximum Content of Portland Cement, lb/yd <sup>3</sup>	—	550
Water/Cementitious Materials Ratio by Wt.	—	0.45
Corrosion Inhibitor, gal/yd <sup>3</sup>	902.06.05	2.0
Synthetic Fibers, lb/yd <sup>3</sup>	902.15	1.5
Permeability of Field Concrete, moving average of three tests, coulombs max	T 277 Modified	2500
Permeability of Field Concrete, individual test, coulombs max	T 277 Modified	3000
Shrinkage at 28 days, microstrains	C 157	400

Note 1: Only Type I or II Portland cement shall be used.

Note 2: Mixes shall contain ground iron blast furnace slag, fly ash or microsilica.

Note 3: The water to cement ratio shall be based upon the total water to cementitious materials ratio. The gallonage of the corrosion inhibitor shall be included in the water/cementitious materials ratio.

Note 4: The permeability test value of field concrete shall be the average of two test specimens representing production concrete. Test specimens shall be molded on the project site in 4 x 8 in. molds conforming to M 205. Test specimens shall be handled under same conditions as compressive strength test specimens in conformance with C 31 for the first seven days. When seven days old, they shall be cured in a 100 F water bath for the remainder of the 28 day curing. The 28 day rapid chloride permeability of the specimens will be determined in conformance with T 277. Test for the geometry of test specimens will be waived.

Note 5: Shrinkage tests will be performed on trial mixes only.

Note 6: High range water reducing admixture may be used except the water reducing requirements will be waived.

Note 7: A sealer conforming to 902.12 shall be used on the finished surface.

**902.10.04 Trial Batch.** A trial batch shall be prepared to certify that each mix meets 902.10.05 and 902.10.06. Approval will be given when the test results meets the minimum required average strength.

Make arrangements with the AME at least two weeks in advance, to have an authorized representative present during the batching and testing. Each trial batch shall consist of at least 3 yd<sup>3</sup> of concrete. Supply all equipment, and labor required to produce the trial batches and conduct the required tests at no additional cost to the Administration.

The AME may waive the requirement for a trial batch when past performance records show that the required average strength requirement has been met.



**902.10.05 Design Required Average Strength.**

Specified compressive strength, $f_c'$ , psi	Required average compressive strength, $f_{cr}'$ , psi
$f_c' \leq 5000$	Use the larger value computed from Eq. (A-1) and (A-2) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = f_c' + 2.33s - 500$ (A-2)
Over 5000	Use the larger value computed from Eq. (A-1) and (A-3) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = 0.90 f_c' + 2.33s$ (A-3)

where:

- $f_c'$  = the 28 day specified compressive strength.
- $s$  = the standard deviation as specified in 902.10.06.

A test is defined as the average strength of two companion cylinders.

**902.10.06 Standard Deviation.**

- (a) When past performance records are available, a standard deviation will be established from documented performance records of the producer consisting of a minimum of 15 consecutive 28 day compressive strength tests obtained within the last 12 months.

The standard deviation will be established as the product of the calculated standard deviation and multiplier.

<b>NUMBER OF TESTS</b>	<b>MULTIPLIER FOR STANDARD DEVIATION</b>
15	1.16
20	1.08
25	1.03
30 or more	1.00

Interpolate for intermediate number of tests.



(b) When past performance records are not available, the required average strength shall meet to the following:

Specified compressive strength, $f_c'$ , psi	Required average compressive strength, $f_{cr}'$ , psi
$f_c' < 3000$	$f_{cr}' = f_c' + 1000$
$3000 \leq f_c' \leq 5000$	$f_{cr}' = f_c' + 1200$
$f_c' > 5000$	$f_{cr}' = 1.10 f_c' + 700$

**902.10.07 Standard of Control.** The average of all sets of three consecutive strength tests shall equal or exceed the critical value as specified in 902.10.03 which shall be computed using the following formula:

$$\text{Critical Value} = f_c' + (1.14 \times S) - 500$$

Failure to conform to this criteria shall be cause for immediate investigation and remedial action up to and including suspension of production. A design standard deviation equal to 15 percent of the specified strength shall be used for calculation until a minimum of 15 test results are obtained.

The actual average strength and standard deviation shall be computed upon the availability of 28 day strength data comprising a minimum of 15 tests. Should this determination indicate an excessive margin of safety, the concrete mix may be modified to produce lower average strength as approved by the Engineer. If these calculations indicate a coefficient of variation greater than 15, the quality of the concrete and testing will be evaluated.



**902.10.08 Testing.** Sampling per T 141. Testing as follows:

TEST	METHOD	MINIMUM TEST FREQUENCY	RESPONSIBILITY
Temperature (e)	T 309	1 per 50 yd <sup>3</sup> (or fraction thereof)	Project Engineer
Slump (a)(e)	T 119	1 per 50 yd <sup>3</sup> (or fraction thereof)	Project Engineer
Air Content (a)(e)	T 152 T 196	1 per 50 yd <sup>3</sup> (or fraction thereof)	Project Engineer
Compression (b)(c)(d)	T 23	1 per 50 yd <sup>3</sup> (or fraction thereof)	Project Engineer
Compression (b)(c)(d) Mix No. 7 Only	T 23	3 per Day	Project Engineer

- (a) A second test will be made when the first slump or air content test fails. Acceptance or rejection will be based on the results of the second test.
- (b) Compressive strength tests are defined as the average of two companion cylinders.
- (c) The Contractor shall be responsible for the making of all early break cylinders and furnishing the molds, stripping, curing/delivery of all cylinders, including 28 day cylinders, to the testing laboratory.
- (d) The Project Engineer will be responsible for making, numbering and signing the 28 day cylinders.
- (e) When constructing plain and reinforced concrete pavements, the testing frequency for slump, air content, and temperature shall be 1 per 100 yd<sup>3</sup> or fraction thereof.

**902.10.09 Acceptance.** Concrete will be acceptable if both of the following requirements are met:

- (a) The average of all sets of three consecutive strength tests equal or exceed the specified design strength.
- (b) No individual strength test (average of two companion cylinders) falls below the specified design strength by more than 500 psi.

**902.10.10 Price Adjustment.** A price adjustment will be based on the Contract unit price per cubic yard of concrete. If the unit is a lump sum item, the price per cubic yard for the concrete will be determined by dividing the cubic yards into the Contract lump sum price.

- (a) **Test Results More Than 500 psi Below the Specified Design Strength.** Failing strength tests will be considered individually with a price adjustment being applied on the percentage basis as shown below.

(Price per yd<sup>3</sup>) X (quantity of yd<sup>3</sup> represented by the failing concrete strength) X (percent of failure).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times [1 - (3600 / 4500 \text{ psi})] = \$4,000.00$$



No payment will be allowed when the test results fall below 50 percent of the specified design strength for structural concrete or 40 percent for incidental concrete.

The Engineer will determine when the strength of the concrete represented by the failing tests is sufficient to remain in place or whether it must be removed and replaced with Specification concrete.

- (a) **Test Results 500 psi or Less than the Specified Design Strength.** Strength failures 500 psi or less than the specified design strength will be averaged with the next two consecutive tests. If those two tests include a failure greater than 500 psi, those tests will be evaluated as in 902.10.10(a) and replaced with the next consecutive test. If the resulting average falls below the specified design strength, a price adjustment will be applied as specified in the table below. Any failure will only be included in one grouping.

STRENGTH BELOW THE SPECIFIED (avg of 3 tests) DESIGN LEVEL, psi	ADJUSTMENT FACTOR
MIX NO. 1 THRU MIX NO. 7	
1 – 100	0.005
101 – 200	0.01
201 – 300	0.02
301 – 400	0.04
401 – 500	0.08

Adjustment price equals (price per yd<sup>3</sup>) X (quantity of yd<sup>3</sup> represented by the failing cylinders) X (the adjustment factor).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times 0.01 = \$200.00$$

**902.11 MORTAR FOR GROUT.** Mortar used for grouting anchor bolts, pipe, handrail posts, and miscellaneous items shall be composed in accordance with one of the following:

- (a) One part Portland cement or blended hydraulic cement and one part mortar sand by dry loose volume.
- (b) Prepared bag mixes consisting of Portland cement or blended hydraulic cement and mortar sand. The prepared mixes shall produce a mortar meeting the strength requirements specified in the Contract Documents.
- (c) Use nonshrink grout when specified. The grout shall have a minimum compressive strength of 5000 psi in seven days when tested as specified per T 106, except that the cube molds shall remain intact with a top firmly attached throughout the curing period. The nonshrink grout shall have a minimum expansion of 0.0 percent after seven days when tested as specified per T 160.



- (d) Epoxy grout shall consist of sand and epoxy mixed by volume in per the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 6500 psi in 72 hours when tested per MSMT 501. Sand for epoxy grout as specified in 901.01.
- (e) An epoxy or polyester anchoring system may be used when approved by the Engineer in accordance with the manufacturer's recommendations. Strength values shall be as specified in the Contract Documents.

**902.12 LINSEED OIL.** Shall consist of a 50-50 mixture (by volume) of boiled linseed oil meeting Federal Specification TT-L-190 and kerosene per D 3699.

**902.13 LATEX MODIFIED CONCRETE.** Portland cement concrete containing prequalified Laboratory approved styrene butadiene latex emulsion is defined as Latex Modified Concrete (LMC).

Latex emulsion shall have a minimum of 90 percent of the nonvolatiles as styrene butadiene polymers. The latex emulsion as specified in Table 902.13 A. The material shall be stored in suitable containers and be protected from freezing and exposure to temperatures in excess of 85 F.

LMC shall be proportioned using volumetric mixing and designed as follows:

<i>LATEX MODIFIED CONCRETE</i>	
MATERIAL	SPECIFICATION LIMITS
Portland Cement, CWT/yd <sup>3</sup> , min	6.6
Latex Emulsion/Cement Ratio	0.31 – 0.34
Water/Cement Ratio, max	0.22
Entrained Air, %	6.0 ± 3
Slump, in.	5 ± 1

The physical properties of LMC shall conform to Table 902.13 B. The Contractor shall furnish the necessary 3 X 6 in. molds per M 205 to be used for the fabrication of compressive strength cylinders.

**Control and Acceptance Sampling.**

- (a) Submit a two qt minimum sample, of the styrene butadiene latex emulsion to the AME daily for each lot of material used in a day's production.
- (b) A batch for LMC is defined as the capacity of the equipment being used on the project. Slump and air samples will be taken and tested before the placement of a batch is permitted. The slump shall be measured four to five minutes after discharge from the mixer. The test material shall be deposited off the deck and not be disturbed during this



waiting period. One additional sample for slump and air will be taken randomly during the placement of each batch. For seven day compressive strength, two tests each per batch are required. A test is defined as consisting of two companion cylinders. The samples for these tests will be taken at random while the placement is in progress.

**TABLE 902.13 A**

<b>REQUIREMENTS FOR CHEMICAL PROPERTIES OF LATEX EMULSION MATERIALS</b>				
<b>PROPERTY</b>	<b>SPECIFICATIONS</b>		<b>QUALITY ASSURANCE TESTS</b>	
	<b>LIMITS</b>	<b>TOLERANCE</b>	<b>PREQUALIFICATION TESTS</b>	<b>CONTROL AND ACCEPTANCE</b>
Color	White	—	X	X
pH	9.0 – 11.0	—	X	X
Weight, lb/gal	8.40 – 8.47	—	X	X
Solids Content, %	46 – 53	—	X	X
*Butadiene Content, % of polymer	30 – 40	—	—	—
Viscosity @ 10 rpm-cps	Match Original	± 20	X	X
*Surface Tension, dynes/cm max	50	—	—	—
*Mean Particle Size, polymer – Å	1400 – 2500	—	—	—
Coagulum, % max	0.10	—	X	X
*Freeze-Thaw Stability, coagulum, % max	0.10	—	X	X
Infrared Spectra of Latex Film	Match Original	—	X	X
Infrared of Alcohol, Soluble Portion of Latex	Match Original	—	X	X
Shelf Life, min	1 yr	—	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 612 except those denoted by an \* shall be conducted as specified in FHWA RD – 78-35.

Note 2: The original or prequalification sample shall be accompanied by the producer's certification on all of the tests and properties noted above and as specified in TC-1.02. The certification shall contain actual test values of the product and the infrared spectrograph.

Note 3: A separate certification is required for each lot of material. The certification shall note the date of manufacture, lot size, and whether or not the material is identical to the formulation of the original sample.



TABLE 902.13 B

<b>LATEX MODIFIED CONCRETE PHYSICAL PROPERTIES</b>			
<b>TEST PROPERTY</b>	<b>TEST VALUES</b>	<b>QUALITY ASSURANCE TESTS</b>	
		<b>PREQUALIFIED TESTS</b>	<b>CONTROL AND ACCEPTANCE</b>
7 Day Compressive Strength, psi min	3000	X	X
28 Day Compressive Strength, psi min	3500	X	—
42 Day Compressive Strength, psi min	3500	X	—
7 Day Flexural Strength, psi min	550	X	—
28 Day Flexural Strength, psi min	650	X	—
42 Day Shear Bond Strength, psi min	2000	X	—
Durability Factor, 300 cycles, % min	85	X	—
Chloride Permeability, Ppm max	510	X	—
Scaling Resistance, 50 cycles, max	3	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 721.

Note 2: Seven Day Compressive Strength Test will be used for Control & Acceptance of the material. The minimum specified design strength is 3000 psi at seven days. The mix design approval and acceptance will be based on a coefficient of variation of 10 percent with a probability of 1 in 10 tests falling below the specified strength. Only test values 80% or greater than the specified strength will be accepted

**902.14 RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE PAVEMENT REPAIRS.** Materials shall be a dry, packaged cementitious mortar having less than 5 percent by weight of aggregate retained on the 3/8 in. sieve and meet the following requirements:

**Classification.**

Class I — For use at ambient temperatures below 50 F.

Class II — For use at ambient temperatures of 50 to 90 F.

Class III — For use at ambient temperatures above 90 F.

**Chemical Requirements.** C 928 except that no organic compounds such as epoxy resins or polyesters as the principal binder.



**Physical Requirements.** Meet the following when tested per MSMT 725:

<b>A. COMPRESSIVE STRENGTH, psi min</b>				
<b>CLASSIFICATION</b>	<b>&lt; 2 hr</b>	<b>2-6 hr</b>	<b>6 hr</b>	<b>28 days</b>
Type I — Slow	—	—	2000	4500
Type II — Rapid	—	2000	—	4500
Type III — Very Rapid	2500	—	—	4500

<b>TEST RESULTS</b>	
<b>TEST PROPERTY</b>	<b>LIMITS</b>
Bond Strength, 7 days, psi min	2000
Length Change, increase after 28 days in water, based on length at 3 hr, % max	+ 0.15
Length Change, decrease after 28 days, % max	- 0.15
Freeze Thaw, loss after 25 cycles in 10% CaCl <sub>2</sub> solution, % max	8
Initial Setting Time, minutes min	10

**Marking.** All packages delivered to the project shall be marked with the following information:

- (a) Date material was packaged.
- (b) Approximate setting time.
- (c) Recommended dosage of water or liquid component.
- (d) Mixing instructions.
- (e) Class or temperature range.

**Certification.** The manufacturer shall furnish certification as specified in TC-1.02 showing the actual test results for each class and type of material submitted to the Laboratory.

**902.15 SYNTHETIC FIBERS.** When synthetic fibers are specified in the Contract Documents, the fibers shall be 1/2 to 1-1/2 in. long and conform to C 1116, Type III. The manufacturer shall furnish certification as specified in TC-1.02. The quantity of fibers used and their point of introduction into the mix shall conform to the fiber manufacturer's recommendations.



**CATEGORY 900  
MATERIALS**

**SECTION 908 — REINFORCEMENT STEEL**

703 **DELETE:** 908.07 thru .10 in their entirety.

**INSERT:** The following.

**908.07 FABRICATED STEEL BAR MATS.** Steel shall meet A 184.

**908.08 WIRE FABRIC FOR PNEUMATICALLY APPLIED MORTAR AND CONCRETE ENCASEMENT.** Fabric shall meet A 185 and be galvanized as specified in 906.01.01. Fabricate from size W1.4 wire on 3 in. centers in each direction or from W0.9 wire on 2 in. centers in each direction.

**908.09 COLD DRAWN STEEL WIRE.** Concrete reinforcement shall meet M 32.

**908.10 TIE DEVICES FOR CONCRETE PAVEMENT.** Tie device sizes shall be as specified and produce a frictional force of at least 160 lb/ft per foot of spacing when tested per MSMT 512.

**908.11 STEEL STRAND.** M 203, Grade 270, Low Relaxation Strand.



**CATEGORY 900  
MATERIALS**

**SECTION 950 - TRAFFIC MATERIALS**

**950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES.**

**DELETE:** 950.03.03 Type IX Retroreflective Sheeting in its entirety.

**INSERT:** The following.

**950.03.03 Permanent Signs Retroreflective Sheeting.** Retroreflective sheeting for permanent signs shall conform to ASTM D 4956-05, except as modified below:

<b>MINIMUM REFLECTIVE INTENSITY VALUES FOR RETROREFLECTIVE SHEETING</b> Minimum Coefficient of Retroreflection ( $R_A$ ) $cd/(lx \cdot m^2)$ Per ASTM E-810 (Average of 0 and 90 degree orientation)									
Observation Angle°	Entrance Angle°	White	Yellow	Fluor. Yellow	Fluor. Yellow-Green	Red	Green	Blue	Fluor. Orange
0.2	-4	570	425	340	455	114	57	26	170
0.2	30	215	160	130	170	43	21	10	64
0.5	-4	400	300	240	320	80	40	18	120
0.5	30	150	112	90	120	30	15	6.8	45
1	-4	120	90	72	96	24	12	5.4	36
1	30	45	34	27	36	9	4.5	2	14

**INSERT:**

**950.03.07 Permanent Traffic Signs (PTS)** Unless otherwise specified in the Contract Documents, retroreflective sheeting for permanent signs shall conform to 950.03.03.



**CATEGORY 900  
MATERIALS**

**SECTION 950.06-ELECTRICAL CABLE AND WIRE**

714 **950.06.03 Cable Duct.**

**DELETE:** Delete 950.06.03 in its entirety.

**INSERT:** The following.

**950.06.03 Cable Duct.** Cable duct shall consist of cables preinstalled in either a polyvinyl chloride (PVC) or polyethylene (PE) plastic duct conforming to NEMA TC7 and the NEC. PVC duct shall conform to D3485. PE duct shall be designed for use as electrical conduit, and shall be manufactured from high density PE resin conforming to D3350, Type III, Grade PE33, Class C, Category 5. Duct dimensions and wall thickness shall conform to NEMA TC2 and D2447 Schedule 40. Minimum nominal diameter of the duct shall be 1-1/2 in. Cable shall be type XHHW, rated for 600 volts.



**CATEGORY 900  
 MATERIALS**

**SECTION 950 - TRAFFIC MATERIALS**

**950.12 LUMINAIRES AND LAMPS**

**950.12.01 Luminaire Construction**

**DELETE: subsection C and replace with:**

- (c) Sign lighting luminaires shall utilize Inductively Coupled Electrodeless Lighting Systems (“ICELS”). Each ICELS shall consist of a heavy gauge A383 aluminum die cast luminaire housing with 5/32” thick microprismatic tempered glass lens. All fasteners shall be stainless steel. The luminaire shall be complete with sheet aluminum reflector made from 95 percent reflective aluminum. The completed luminaire shall be U.L. and wet location listed. The luminaire shall be compliant with vibration testing in accordance with ANSI C136.21, the 2001 American National Standard for Roadway Lighting Equipment – Luminaire Vibration. The lamp and ballast shall be securely mounted within the luminaire. The completed luminaire housing shall be IP66 rated. The luminaire shall be rated to start and operate between -40° F to +131° F when operated at 277V. The lamp and ballast shall be rated for a 100,000 hour life and lumen output shall be at least 70 percent of initial output at 60,000 hours. Lamp system Color Rendering Index (CRI) shall be 75 or greater. Ballast shall be universal type suitable for operation with any standard voltage from 120VAC through to 277VAC, 60Hz. The lamp system shall be an instant on/instant re-strike system. The system wattage (lamp and ballast) shall be rated 150 Watts with maximum system draw of 156W at 277V and 161W at 120V. The lamp and ballast shall be furnished with a six (6) year manufacturer warranty that shall replace failed lamps and ballasts with parts-only replacement lamps or ballasts upon failure.

**ADD: to table in section 950.12.02**

<b>TYPE</b>	<b>WATTS</b>	<b>INITIAL LUMENS</b>	<b>RATED LIFE (10 hr/start)</b>	<b>PERCENT INITIAL LUMENS</b>
ICELS	150	11,000	60,000	≥0.70 @ 60,000hrs ≥0.63 @ 100,000hrs

**CATEGORY 900  
MATERIALS**

**SECTION 951 — PAVEMENT MARKING MATERIALS**

**951.04 REMOVABLE PAVEMENT MARKING TAPE.** Removable pavement marking tape shall remain in place on the pavement surface without being displaced by traffic, or affected by weather conditions. The material shall be capable of being removed without the use of heat, solvents, grinding, or sand blasting and shall not leave an objectionable residue.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

**Performance Requirements.** When applied in conformance with the manufacturer's recommendations, the material shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface or underlying markings remain stable. The material shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage that will significantly impair the intended usage of the tape throughout its useful life, and shall show no significant tearing while in place, or other signs of poor adhesion. The material shall be capable of easy removal without tearing into small pieces.

**951.04.01 White and Yellow.** Removable preformed pavement marking materials shall conform to the requirements of the MdMUTCD and the following:

- (a) **Composition.** The marking material shall consist of a mixture of polymeric materials, pigment, and glass beads distributed uniformly throughout the surface.
- (b) **Color.** The color of the marking materials shall match Federal Test Standard No. 595 for the following color numbers:

White - 37925  
Yellow - 38907

- (c) **Glass Beads.** Glass beads shall conform to the General Requirements of M 247 and have a minimum refractive index of 1.90 when tested as specified in MSMT 211.
- (d) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.
- (e) **Certification.** Samples submitted to the Office of Materials Technology (OMT) for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.02.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.



(f) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over 180 day period as specified in MSMT 723 for conformance with the following:

- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2.
- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Appearance, and Night Visibility - minimum weighted rating of 4.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 120 days to be considered satisfactory.

**951.04.02 Black.** Removable preformed pavement marking materials shall conform to the requirements of the Md MUTCD and the following:

(a) **Composition.** The non-reflective blackout tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments, and inorganic fillers distributed throughout its cross-sectional area, with a matte black non-reflective surface. The film shall be pre-coated with a pressure sensitive adhesive. A nonmetallic medium shall be incorporated to facilitate removal.

For patterned materials, a minimum of 20 percent of the total surface area shall be raised and coated with nonskid particles. The channels between the raised areas shall be substantially free of particles.

(b) **Color.** The color of the blackout material shall match Federal Test Standard No. 595 for the following color numbers:

Black - 37038 (or as approved by the Engineer)

(c) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.

(d) **Certification.** Samples submitted to OMT for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.02.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.



(e) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over a 180 day period as specified in MSMT 723 for conformance with the following:

- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2. The manufacturer shall show that the blackout tape can be manually removed after its intended use, intact or in large pieces, at temperatures above 40 F without the use of heat, solvents, grinding, or sand or water blasting. The blackout tape shall remove cleanly from existing markings that are adequately adhered to the pavement surface.
- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Adhesion, Appearance, and Night Visibility - minimum weighted rating of 4. The manufacturer shall demonstrate that the properly applied blackout tape adheres to the roadway and existing stable roadway markings under climatic and traffic conditions normally encountered in the construction work zone.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 180 days to be considered satisfactory.

**951.04.03 Packaging.** Preformed pavement markings shipping package shall conform to the manufacturer's shipping requirements to prevent damage during delivery and unloading of all shipments. The shipping package shall be marked with the following information placed on each container:

- (a) Description of item.
- (b) Date of manufacture.
- (c) Successful Bidder's Name.
- (d) Purchase Order Number.
- (e) Lot Number.
- (f) Color.
- (g) Installation instructions.