

ALABAMA DEPARTMENT OF TRANSPORTATION
Specification

Performance Pavement Markings

MBS 2008-12 PM

Section 1.0

PAVEMENT STRIPING, MARKING AND RPM MANAGEMENT SCOPE OF SERVICES

1.1 Scope of Work

The work under this Section consists of the installation of traffic control pavement striping, markings and raised pavement markers in accordance with the details shown on the Alabama Department of Transportation standard plan sheets. This Section shall also cover the maintenance and bonding through the performance period of the pavement markings. The Department will award this contract on an all or none basis. The Contractor must submit a bid on all items or the bid will be deemed incomplete and thus rejected. This work shall include installation of traffic control pavement striping, markings and raised pavement markers on an individual work order basis as determined by Alabama Department of Transportation. Each individual work order shall be issued to the Contractor and shall be completed in the time specified for that work order.

1.2 General Requirement

The Department requires all work to be performed to current Standards and Specifications throughout the contract duration, as may be updated throughout the life of the contract. The Contractor will manage all pavement striping and marking assets within the project limits and will perform work that produces end results in accordance with Department Specifications (including all Supplemental Specifications and Special Provisions), Design Standards, Standard Maintenance Special Provisions, Maintenance Activity Standards, Procedures, Handbooks, Guides, and Manuals, including the Manual on Uniform Traffic Control Devices (MUTCD), American Society of Testing and Materials (ASTM), and Code of Federal Regulations (CFR), in effect at the time of the performance of the specific work, and consistent with the Department's statewide maintenance practices.

The Contractor shall adhere to all federal, state and local laws pertaining to proper health and safety measures to ensure safety for the traveling public, Department employees, Contractor employees, and Subcontractor employees.

All work on this project shall conform to the Alabama Department of Transportation, Standard Specifications for Highway Construction 2008 dated latest revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

In case of discrepancy between this Specification and the standard provisions, this Specification shall prevail.

Contractor shall provide a performance bond equal to \$10 million dollars during the term of the contract. In addition the contractor will be required to provide a warranty bond for each work order placed by the Department. The value of the warranty bond shall be equal to the work order invoice. The term of the warranty bond will be consistent with Bonding Period as listed in section 3.2 Pavement Markings Performance Criteria for Bonded Period. The warranty bond would survive the term of the contract.

The Contractor will comply with the Department's lane closure restrictions/requirements at the time the work order is issued. In some locations this may require work to be performed at night.

All claims and disputes by the Contractor will be resolved in accordance with the Department Standard Specifications and revisions thereto.

Section 2.0 Materials Specifications & Performance Standards

2.1 General

Materials shall produce an adherent, retroreflective pavement striping, miscellaneous pavement markings and raised pavement markers (RPM) capable of resisting deformation by traffic. The requirements specified herein and the performance requirements of this Section will apply for any new application throughout the duration of the warranty period regardless of the type of formulation used. Contractor will have option to select materials from List V-4 or V-2 as appropriate of the Materials, Sources, and Devices with Special Acceptance Requirements (MSDSAR), unless authorized in writing by an ALDOT designated engineer.

2.2.1 Materials

All pavement marking materials shall meet Alabama Standard Specifications for Highway Construction 2008 Edition or latest, specifically Division 800 Traffic Marking Materials and Division 700 Traffic Control Devices and Highway Lighting.

Warranted materials shall be furnished in accordance with the requirements given in Sections 856 and 857 for the following class and type shown in Table 2.2.1a:

Table 2.2.1a Warranted Traffic Stripe, Markings, Legends, & RPM

CLASS OF TRAFFIC STRIPE, MARKINGS, & LEGENDS		
MATERIAL	CLASS	Type
Warranted Traffic Marking Material	W	A
Markings & Legends	2 & W	A
High Build Paint	1H	A
Thermoplastic Material	2	A
Raised Pavement Markers	A-H	1-A, 1-B, 2-A, 2-B, 2-C, 2-D, 2-E

2.2.2 Contractor Selection of Materials

The Contractor shall have the option to select from the ALDOT MSDSAR V-4, V-2 or use ALDOT approved alternative material. Bonded materials shall meet the requirements in the Alabama Standard Specifications for Highway Construction 2008 Edition or latest, specifically Division 800 Traffic Marking Materials and Division 700 Traffic Control Devices and Highway Lighting and shall be furnished in accordance with the requirements given in Sections 856 or 882 for the class and type shown in Table 2.2.1a, above. The use of any materials not on the approved product list must be approved by ALDOT prior to placement of the material.

2.3 Initial Performance Acceptance Criteria

2.3.1 Retroreflectivity Class W, 1H, 2, striping, markings, and legends

The initial retroreflectivity shall be measured by the Contractor in accordance with ASTM E 1710, "Standard Specifications for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer". Measurement shall be made using a portable retroreflectometer during the installation or alternatively using a mobile retroreflectometer within 45 days of installation. The initial retroreflectivity of all newly placed pavement stripes shall meet the minimum requirements in Alabama Standard Specifications for Highway Construction 2008 Edition or latest,

Division 700 Traffic Control Devices and Highway Lighting, and the specifications of the contract provisions.

Initial retroreflectivity requirements will not apply to transverse lines, cross-hatches, diagonals, messages, and symbols.

2.3.2 Color Class W, 1H, 2, striping, markings, and legends

All pavement markings shall meet the requirements for daytime and nighttime color in accordance with ASTM D 6628-03 Standard Specification for Color of Pavement Marking Materials. Samples will be collected by Division personnel at the time of installation. These samples will be sent by Division personnel to Materials and Test laboratory to confirm compliance to ASTM D 6628-03. One sample of each color and each product type will be collected for testing.

2.3.3 Initial Performance Acceptance Criteria Class A-H

Raised Pavement Markers will be selected from the list V-2.

Section 3.0

Performance Standards & Acceptance Criteria for Bond Period

3.1 Measurement Zone

3.1.1 Definition

A measurement zone is defined as one mile segment of pavement striping within the project scope. In each measurement zone, the measurements of each longitudinal line (broken, solid, dotted, etc.) shall be made in the direction of traffic flow, except on the centerline of two-lane roads where the required number of measurements will be made in each direction. The measurements shall exclude all symbols, legends, and transverse lines.

Performance of traffic striping within a measurement zone is defined as the average of a minimum of 10 readings (1/10th mile intervals) collected by a mobile reflectometer per line measured in a one mile segment. Measurements will be performed according to the requirements of ASTM E 1710-05.

3.1.2 Frequency of Measurement

Measurements shall be made within 45 days (See Section 2.3.1) of the initial installation and annually thereafter within (±) 30 days of the anniversary date of acceptance.

3.2 Pavement Markings Performance Criteria for Bonded Period

All pavement striping on the mainline and ramps shall be reflective and meet the reflectivity performance specifications shown in the table.

CLASS OF TRAFFIC STRIPE			
CLASS	MATERIAL	Reflectivity Level (mcd/lx/m ²)	Performance Bonding Period (Years)
W	Warranted Traffic Marking Material	130	6
1H	High Build Paint	100	2
2	Thermoplastic Material	@ 3 years	5
		@ 5 years	
2 & W	Traffic Control Markings and Legends	Visual/road* presence	2

A-H	Raised Pavement Marker	Visual/road** presence	2
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3.2.1 Raised Pavement Marker Performance Criteria for Bonded Period

The performance of raised pavement markers shall include road presence and visual retroreflectivity. The raised pavement markers shall be visible at night at a distance of 320ft when viewed from a passenger vehicle using low beam headlight illumination. If more than 2 consecutive 80ft-center markers per line are not visible within a measure zone as defined in Section 3.1.1 (and 3 consecutive 40ft-center markers), the failed markers shall be replaced within 30 calendar days from the inspection date.

The road presence shall be monitored annually for adhesion failure in accordance with the calculation shown below. If more than 3 consecutive markers (2 consecutive markers at 80ft center) are missing within a measurement zone, the missing markers shall be replaced within 30 calendar days from the inspection date. The markers shall have at least 50% of lens area functional.

Road Presence Calculation

Road presence is calculated in the following manner:

- (1) Establish the total number of markers in the measurement zone (T)
- (2) Count the markers in placed (R)
- (3) Calculate presence percent (%)

$$\text{Road Presence (\%)} = R/T * 100$$

If the raised pavement marker failure rate for either road presence or visual reflectivity exceeds 50% of the total, entire marker inventory shall be replaced according to ALDOT specifications. The Department will determine if old markers must be removed prior to placement of new markers.

3.2.3 Color During Bonded Period

The color of traffic striping and traffic control markings for Class W, 1H, 2 must be visually acceptable to ALDOT engineer. If there's a discrepancy in interpretation, the suspected areas shall be measured according to ASTM D 6628-03 for color.

There is no color requirement for raised pavement markers.

3.2.4 Transverse, Gore, Channeling Lines, and Miscellaneous Markings Durability Performance Criteria (Class 2, Class W)

The markings shall maintain a minimum road presence of 77% for a two year period per ASTM D913 (Standard Test Method for Evaluating Degree of Resistance to Wear of Traffic Paint).

The markings will be evaluated for road presence according to the criteria of ASTM D913. ASTM D913 includes evaluation categories and reference photographs for road presence of in service pavement markings. Categories include road presence levels at 97%, 92%, 77%, and 60% for pavement markings:

- Markings and Legends showing wear through exceeding 23% of the total area of the marking or legend shall be repaired or replaced.
- Markings and Legends shall be maintained to have 92% road presence as a cumulative total of the entire marking inventory per location.
- A plan for material selection and installation procedure shall be submitted and approved by the Department prior to performing any replacement or repairs

3.3 Notice of Deficiencies

Upon notification of a deficiency during the warranty period, the Contractor shall correct the deficiency by reapplication of new markings in accordance with ALDOT specifications.

When the Department determines that it is necessary to remove a deficiency, the Contractor shall use a method that will minimize damage of the pavement and which will eliminate the striping or marking visually for both day and night time conditions. During the warranty period, deficiencies shall be corrected following the procedures set forth in Section 4.3.2.1, using the original type material, unless an equal or more appropriate material under the circumstances (i.e. pending resurfacing contracts) is submitted to and approved by the Department. If the Contractor fails to correct the deficiencies as specified, the Department has the authority to have the deficiencies corrected by any other lawful means, including requiring the surety to correct the deficiencies. The Contractor shall be responsible for the cost of such corrective work. All work and materials required for correction of deficiencies shall be inclusive in the fixed contract price.

Section 4.0

4.0 Pavement Markings Asset Management

4.1 Pavement Markings Asset Inventory Database

Pavement markings asset inventory components shall include geo-spatial referenced asset locations of long line segments and discrete markings. The minimum requirement for pavement marking inventory components is shown in Table 4.2.

Table 4-2 PM inventory components

Inventory Data	
(1)	Geo-Spatial Asset Location a. Long line stripes b. Transverse markings , symbols, and legends
(2)	PM Attribute a. Broken/solid lines b. Wide stripings c. Symbols, Legends d. Special markings or stripings
(4)	Documentation a. Photo d. Mapping e. Data file f. Website

4.2 Data Access, Management, and Reporting

Contractor shall provide, through the term of the contract, an Internet-based website for tracking pavement marking installation and performance monitoring. The website shall include all specific requirements outlined in this specification and shall be accessible by Department designated individuals only, by use of an interactive password security system. Upon completion of this contract, the contractor shall deliver to the Department the project tracking database. All reports must be reviewed and certified by a licensed professional engineer.

4.2.1 Website Components

Interactive Website Specifications

1. The website will include an interactive map of the project area, indicating the location of each project feature. The interactive map will include navigation capabilities to pan and zoom to various locations and resolutions on the map.
2. The website will provide click and drag capability to allow the user to select a project feature or features to obtain information about that feature. The data will be displayed in tabular format per the data requirements below.
3. The base map will indicate all applicable roadways within ALDOT right-of-ways and will designate such roadways by proper name. Base map GIS data of the project area will be of sufficient accuracy for the project. The base map data will be provided by ALDOT in an ArcGIS-compatible data format.

4. The website will be a secure site, accessible from a typical personal computer with internet access, and will be accessible by password only. Passwords will be granted to individuals at ALDOT's discretion.
5. The website will include a communication option to directly send an email to Contractor to make an inquiry about any of the pavement markings, schedule for completion, or other information included in the project.

4.2.2 Data Requirement

- A. Data reported on the website for each work zone will consist of the following:
 1. Hwy#
 2. Job#
 3. Reported Footage installed
 4. Field Supervisor
 5. Status
 6. Start Date
 7. Finish Date
 8. Date Evaluated
- B. Site locations for each feature will be shown on the base map and plotted using GPS coordinates.
- C. Pavement markings will be identified on the map with a symbol that is color-coded according to pavement marking type.
- D. A legend will be provided identifying the color code for each.
- E. The data included in item A above will be downloadable from the website in a tabular format that can be pasted into any word processing or spreadsheet software.
- F. Contractor will send the complete GIS database through electronic means periodically to ALDOT.
- G. The website will be fully functional within thirty working days of the notice to proceed on the contract and after receipt of ALDOT-provided base map data.
- H. Data on the website will be updated for ALDOT to report progress of work on the contract.

4.3 Annual Submittal of Certification of Performance

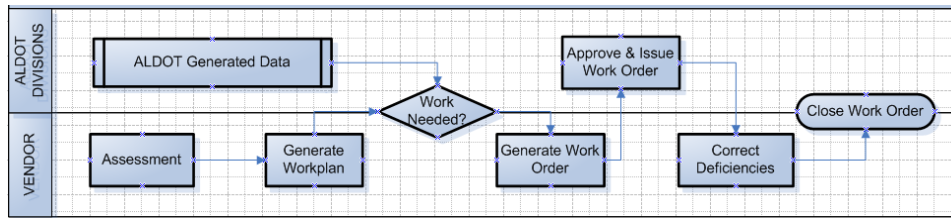
4.3.1 Certification of Performance

A "Certification of Performance" shall be submitted annually for the duration of the bonded performance period as defined in Section 3.2 above. The Contractor shall submit the Certificate of performance annually.

The pavement markings shall be certified as meeting the performance requirements for reflectivity and durability. The Certification period begins on the date the Department accepts all pavement markings. The certification shall be submitted annually within 30 calendar days of the anniversary date of the certification.

The "Certification of Performance" shall be submitted annually to the Maintenance Engineer in electronic format, through the use of an Internet-based data management method in accordance with the requirements of this specification. The data reporting format shall be approved by ALDOT engineer.

4.3.2 Annual Assessment cycles



The contractor shall be required to generate and update inventory (markings type, conditions) on an annual basis. The deficient assets as defined in Section 3 Performance Standards & Acceptance Criteria for Bond Period will be assessed and quantified on an annual basis. The process of assessment is shown in the diagram above.

4.3.2.1 Contractor Notification and Correction of Deficiencies

The Contractor shall notify the Maintenance Engineer if a deficiency occurs during the bonding period. The Contractor shall submit a plan for the performance of the work to the Maintenance Engineer within 14 calendar days before the work will begin. Work shall not begin until the Maintenance Engineer informs the Contractor in writing that the plan for the work required under the bond is complete. Work shall commence not more than 30 days after approval of the work plan by ALDOT

4.3.2.2 Department Notification

The Maintenance Engineer will notify the Contractor if a deficiency occurs during the bonding period. The Contractor shall submit a plan for the performance of the work to the Maintenance Engineer within 14 calendar days before the work will begin. Work shall not begin until the Maintenance Engineer informs the Contractor in writing that the plan for the work required under the bonding is complete. Work shall commence not more than 30 days after approval of the work plan by ALDOT.

4.3.3 Annual Maintenance /Repair Quantity

The contractor shall quantify the annual work quantity in the proposed annual work order using the data from the annual assessment. The work quantity shall include the following:

- a. Route
- b. Asset description by type
- c. QTY
- d. Unit

4.3.4 Work Order Release Process

ALDOT representative shall verify that the work quantity in the proposed annual work order will address all deficient markings and markers. Once the work order is approved or agreed upon, the contractor shall initiate the maintenance activities within 14 days from the date of approval.

Section 5.0 **Payment, Terms and Conditions**

5.1 Payment Items

The accepted square feet of Traffic Control Markings or Legends will be paid for at the contract unit price bid which shall be full compensation for the item complete in place and includes the cleaning of the pavement, furnishing and applying the markings or legends, and for all materials, equipment, tools, labor and incidentals necessary to complete the work. Vacuuming of material debris, when required by the engineer as part of Removal Pay Item work, will be a subsidiary obligation of the Removal Pay Item.

The accepted square feet of Traffic Control Markings or Legends Removed will be paid for at the contract unit price bid which shall be full compensation for the item complete in place and includes traffic control for removal, all necessary materials, equipment, tools, labor and incidentals necessary to complete the work.

Pricing of all traffic control pavement striping is based on a line width of five (5) inches. Payment will be based on a proportional adjustment for actual width of installed lines. For example, a 4-inch line will be paid at a rate of 4/5 times the bid price. Raised pavement marker shall be price by each.

Traffic control for lane closure charges will NOT apply to installations using moving traffic control operation.

Class 1 and 2T stripe are not bonded and are subject to ALDOT standards and specifications.

The mobilization payment shall be paid to the Contractor in accordance to the schedule shown in Table 5.1 below if a purchase order fails to satisfy the minimum dollar amount of the Specified Material in the Table. The mobilization amount shall be paid for each Specified Material in the Table which falls below the minimum order amount on any purchase order. A purchase order change request resulting in orders above the minimum supersedes the mobilization payment.

Table 5.1 Mobilization For Minimum Work Quantity

Specified Materials	Minimum Order for Striping or RPM	Minimum Order for Markings, Symbols, and legends	Mobilization Payment Due (Striping or RPM)	Mobilization Payment Due (Markings, Symbols, & legends)
Class 1 (Paint)	\$1,500.00	\$1,500.00	\$1,000.00	\$1,000.00
Class 1H (High Build)	\$2,500.00	\$2,000.00	\$1,500.00	\$1,000.00
Class 2 (100 mil Thermo)	\$15,000.00	\$2,500.00	\$8,500.00	\$1,500.00
Class W (Tape or PolyCarb)	\$7,500.00	\$2,500.00	\$1,250.00	\$1,250.00
RPM	\$1,500.00	N/A	\$1,000.00	N/A

5.2 Terms

5.2.1 Subject to Section 5.2.4 of this section, Contractor’s total compensation to be paid during the term of the contract will be made in accordance with the Payment Schedule as set forth in Section 5.

5.2.2 Contractor shall submit invoices to the Department for the Services completed in accordance with this Agreement. All invoices are due within thirty days after invoice date. Payment will be based upon the quantities measured by the department.

5.2.3 If the Department disputes any portion of a Contractors invoice, then the Department will: (a) pay any amount not in dispute by the due date; and (b) within five business days after receipt of that invoice, inform Contractor in writing of the disputed amount and the specific reason(s) for withholding payment. On Contractor’s receipt of this, the Parties will work together in good faith to resolve such disputes in a prompt and

mutually acceptable manner. The Department agrees to pay any disputed amounts within five days after the issues have been resolved.

5.2.4 Line item prices after the first twelve months of the contract will be adjusted annually on the anniversary of the Agreement based upon changes to the US Consumer Price Index ("CPI") over the previous year or 3%, whichever is the lesser amount. The payments will be the increased or decreased by a percent equal to the percentage change in the CPI.

5.2.5 The duration of the contract will be six (6) years with a renewal option for two additional six (6) year terms. If the renewal option is exercised, the Department will, for inflation, add an additional percent (___ %) based on the US Consumer Price Index for the period of the contract term.

5.2.6 The Department will determine and publish a monthly "Fuel Index" (I_m) utilizing the average area terminal price reports for regular unleaded gasoline and No. 2 fuel of the "Platts Oilgram Price Report" published during the week in which the first day of the month occurs.

The Base Fuel Index (I_b) for the project will be the monthly fuel index published for the month in which the bids were opened for the project.

The contractor will establish a line item fuel factor as an average percentage of operating costs. This fuel factor will be used regardless of the material or service type of the work order and will remain unchanged during the term of the contract.

In the event the Base Fuel Index (I_b) increases during the contract period, the Department will increase the payment to the contractor consistent with the change in the Base Fuel Index (I_b).

Example:

Work order value \$20,000.00

I_b Base Fuel Index = 3.00

I_m Fuel Index for Current Month = 3.50

Fuel Factor = 10%

Department calculates payment $((I_m - I_b) / I_b) \times \text{work order invoice} \times \text{Fuel Factor}$
 $((3.50 - 3.00) / 3.00) \times \$20,000.00 \times 0.10 = \333.33

In the event the Base Fuel Index decreases during the contract period the contractor will credit the Department consistent with the change in the Base Fuel Index (I_b).