State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought.
Help Save Water!

To: DEPUTY DISTRICT DIRECTORS and HQ DIVISION CHIEFS
for:
CONSTRUCTION, DESIGN, MAINTENANCE, and TRAFFIC OPERATIONS

Date: October 15, 2015

File: Division of Traffic Operations

From: THOMAS P. HALLENBECK
Chief
Division of Traffic Operations

for TONY TAVARES
Chief
Division of Maintenance

Subject: **WARRANTY-BASED PAVEMENT MARKING PILOT PROJECTS**

The purpose of this memo is to present guidelines for the use of warranty-based pavement marking material. Warranted pavement markings should provide the following benefits:

- Lower life-cycle and maintenance costs
- Reduced maintenance staff exposure to live traffic
- Reduced traffic delay due to construction or maintenance activities
- Reduced public inconvenience
- Improved product performance and enhanced quality
- Additional pavement marking contracts will not be needed during the warranty period at the project location
- Risk transferral to the product manufacturer
- Promotes innovation and new technology

Caltrans recognizes the potential cost-effectiveness and safety enhancement of warranties on a system-wide basis; however, the initial use of pavement marking warranties will be conducted through pilot projects. Accordingly, the Office of Traffic Engineering within the Division of Traffic Operations developed the attached Non-Standard Special Provision (NSSP) for Pavement Striping and Marking with a warranty. Warranted pavement markings should be considered for the following:

- Urbanized freeways, expressways, and other non-snow removal area highways with restricted lane closure opportunities
- Bridges and tunnels
- Enhanced pavement marking visibility
- Roadways with higher traffic volumes and newer pavement
- Locations with no programmed rehabilitation projects within the next five years after the completion of construction

The decision to use a pavement marking warranty is to be made during the Project Initiation Document (PID) or Project Approval and Environmental Document (PA&ED) phases. The monitoring and enforcement of the warranty during the warranty period will be tasked to Caltrans' Division of Maintenance.

Prior to moving forward with the pilot project, please review the attached Rights and Responsibilities FAQ.

If you have any questions regarding this memo, please contact Duper Tong, Chief, Office of Traffic Engineering at (916) 654-5176, or by e-mail at duper.tong@dot.ca.gov; or Ganzalo Gomez, Senior Transportation Engineer, Office of Roadway Maintenance at (916) 654-2461, or by e-mail at gonzalo.gomez@dot.ca.gov.

Attachments:

A. Warranty-based Pavement Marking NSSP
B. Warranty-based Pavement Marking Rights and Responsibilities FAQ

NEW
Revised 8/05/16 AF

Section 84-9. Use if traffic stripe and pavement marking tapes are required for projects with pavement marking warranty.

Do not use in mountainous areas above 5,000 feet with heavy snowfall or where routine snow plowing will be performed.

You must contact Atifa Ferouz at (916) 654-5032 or atifa.ferouz@dot.ca.gov and provide the following project information prior to using this NSSP on a project: (1) Project EA & ID (2) Location & Post Mile (3) Construction Start & End Dates

Add to Section 84:

84-9 TRAFFIC STRIPE AND PAVEMENT MARKING TAPE

84-9.01 GENERAL

84-9.01A Summary

1

Section 84-9 includes specifications for applying traffic stripe and pavement marking tape.

2

Traffic stripe and pavement marking tape must consist of white or yellow films embedded with ceramic beads and, when shown, a contrasting black film border. They must be placed in conformity with the types, dimensions, and lines shown on the plans or as directed by the Engineer.

84-9.01B Submittals

3

For each batch of tape, before applying the material, submit:

1. Certificate of compliance
2. Manufacturer's warranty for durability, performance, and retroreflectivity.
3. A Warranty Bond to insure the State during the warranty period.

4

If a surface preparation adhesive is used to precondition the pavement surface, submit manufacturer's product data before applying the material.

84-9.01C Warranty Requirements

5

Traffic stripe and pavement marking tape must adhere to the roadway for the period indicated under the warranty. A cumulative 5% or greater loss of traffic line due to non-adhesion in any 400 foot segment of traffic line constitutes failure of the material in that segment. A cumulative 5% or greater loss of square area due to non-adhesion in any individual marking constitutes failure of the material in that marking.

6

The period of the warranty is as follows:

Application	Warranty period
Longitudinal markings	5 years
Symbols and legends	2 years

7

The warranty period covers the specified service life of the materials and begins after all traffic stripes and pavement markings are installed. Furnish the Engineer with an installation log indicating the application, location (including 'begin' and 'end' descriptions), and date of installation. The manufacturer shall repair all defective areas identified by the Department after initial installation or during the Warranty Period.

8

Upon notification of any problems with the striping, the manufacturer shall have 20 days to respond with a replacement plan and schedule acceptable to the Engineer unless weather limitations prevent the corrective work. The Department must be given notification before the corrective work begins to allow for inspection of the operation. Failure to execute the accepted plan within 72 hours will result in a $1,000.00 per day penalty, which will be imposed until compliance. Should the manufacturer not commence work, weather permitting, and pending severity, the Department reserves the right to remedy the condition and charge the contractor for the work. At the discretion of the Department, temporary pavement marking may be required, at the manufacturer’s expense, to protect traffic until repairs can be made.

9

The warranty period will stop until corrective work is approved as completed by the Department. The manufacturer will coordinate the repair start and end dates with the Department.

10

The manufacturer is responsible for the costs of removing and replacing traffic stripe and pavement marking tape that fails to meet the performance requirements during the warranty period. All warranty work must be performed at no cost to the Department. The cost of all warranty work must be borne by the manufacturer. These costs include, but are not limited to: surface preparation, materials, equipment, labor, and traffic control. The Department does not pay for the replacement material. Replacement materials must comply with section 84-9. If replacement of the original materials is needed, the replacement materials will only be covered by the original warranty period. No extension of the original warranty period will occur. Submit the manufacturer's warranty before placing the material.

11

The manufacturer must provide a warranty bond for the warranty period. The bond must be in the sum of 100% of the original contract total cost bid for this item and any other incidental costs necessary to complete this work. The bond shall be in effect for the entire warranty period (including the time to perform corrective work) listed in the table in section 84-9.01C. The Engineer will withhold in reserve an amount equal to 50% of the total Contract amount bid for this item until the Warranty Bond has been received. Each bond must be provided by a Surety licensed as surety, and qualified to do business in the State of California.

12

The manufacturer is responsible for providing all traffic control required for any warranty work. Traffic control must be in accordance with the Department’s standard plans, standard special provisions, and standard specifications. The manufacturer must obtain approval from the District Traffic Manager (DTM) prior to any work being performed.

13

When the Department determines that it is necessary to remove a deficiency, the manufacturer must 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 specifications set forth by Caltrans’ standards.

84-9.02 MATERIALS

14

Traffic stripe and pavement marking tape must be preformed, retroreflective, and consist of one of the following:

1. White film with retroreflective ceramic beads
2. Yellow film with retroreflective ceramic beads
3. White film with retroreflective ceramic beads and a contrasting black film border
4. Yellow film with retroreflective ceramic beads and a contrasting black film border

15

If used, the contrasting black border must be a nonreflective film bonded on each side of the white or yellow film to form a continuous roll. Each black border must be a minimum of 1-1/2 inches wide. The width of the contrast marking tape must be at least 3 inches wider than the borderless white or yellow film.

16

The retroreflective ceramic beads must provide immediate and continuing retroreflection.

17

Traffic stripe and pavement marking tape must have an embossed pattern of raised surfaces that enhance its visibility in wet weather. The product used must be a Permanent Traffic Striping and Pavement Marking Tape listed on the Authorized Materials List for Prequalified and Tested Signing and Delineation Materials.

18

Traffic stripe and pavement marking tape must have a precoated pressure-sensitive adhesive that adheres to asphalt cement concrete pavement and portland cement concrete pavement.

19

When tested using a retroreflectometer under ASTM E1710 and the sampling protocol specified in ASTM D7585 the traffic stripe and pavement marking tape must have minimum initial retroreflectivity values complying with ASTM D4505 (Reflectivity Level 1) as shown in the following table:

Retroreflectance Values for New, Dry Samples of Traffic Stripe and Pavement Marking Tape

Entrance angle	Observation angle	Reflectivity level	R_L[a] (mcd/m^2/lx)[b]	
			White markings	Yellow markings
88.76°	1.05°	Reflectivity I	500	300

[a] R_L is the coefficient of retroreflected luminance
[b] millicandelas per square meter per lux

20

Traffic stripe and pavement marking tape must have a skid resistance meeting Level A as defined in ASTM D4505

84-9.03 CONSTRUCTION

21

Apply the traffic stripe and pavement marking tape under the Manufacturer's recommendations. You may use a surface preparation adhesive to precondition the pavement surface.

22

A manufacturer's representative or manufacturer-certified contractor must monitor the installation. Cooperate with the Manufacturer’s Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer’s recommended procedures.

84-9.04 PAYMENT

23

Traffic stripe tape is measured along the line of the traffic stripe without deductions for gaps in the broken traffic stripe.

24

A double traffic stripe tape is measured as 2 traffic stripes.

25

Pavement marking tape is measured by the area covered.

Bid Item Numbers for Warranty-Based Traffic Stripe and Pavement Marking Tape

Item No	Item Description	Unit Pay	Section
849000A	4" TRAFFIC STRIPE TAPE (Warranty)	LF	84
849001A	4" TRAFFIC STRIPE TAPE (BROKEN 18-12) (Warranty)	LF	84
849002A	4" TRAFFIC STRIPE TAPE (BROKEN 6-1) (Warranty)	LF	84
849003A	4" TRAFFIC STRIPE TAPE (BROKEN 12-3) (Warranty)	LF	84
849004A	4" TRAFFIC STRIPE TAPE (BROKEN 17-7) (Warranty)	LF	84
849005A	4" TRAFFIC STRIPE TAPE (BROKEN 36-12) (Warranty)	LF	84
849006A	6" TRAFFIC STRIPE TAPE (Warranty)	LF	84
849007A	6" TRAFFIC STRIPE TAPE (BROKEN 8-4) (Warranty)	LF	84
849008A	8" TRAFFIC STRIPE TAPE (Warranty)	LF	84
849009A	8" TRAFFIC STRIPE TAPE (BROKEN 12-3) (Warranty)	LF	84
849010A	8" TRAFFIC STRIPE TAPE (BROKEN 36-12) (Warranty)	LF	84
849011A	PAVEMENT MARKING TAPE (Warranty)	SQFT	84