

Department of Resources Recycling and Recovery

SCOPE OF WORK

Rubberized Hot Mix Asphalt Performance Models

I. INTRODUCTION/OBJECTIVES

The California Department of Transportation (Caltrans) and hundreds of local agencies throughout the state use a pavement management system (PMS) to determine which strategies to use in their pavement maintenance and rehabilitation projects. The PMS uses performance models to predict future pavement condition and lifespan.

The original PMS performance models were developed in 1980s, and much has changed in pavement technology since then, such as new materials and improved performance. It is now well-documented that rubberized hot mix asphalt (RHMA) pavements, specifically asphalt rubber and terminal blend, have better performance than conventional hot mix asphalt (HMA) in terms of resistance to reflective cracking, durability, skid-resistance, and lower noise. Based on these benefits, it is expected that the performance models of RHMA are significantly different than those of HMA overlays; however, RHMA performance models do not currently exist for PMS programs.

The purpose of this contract is to develop RHMA performance models that can be used in PMS systems statewide. This contract will potentially increase the use of RHMA by documenting its superior longevity and performance via models that will be used in pavement management systems, thereby assisting Caltrans and local governments that utilize PMS in making their pavement maintenance and rehabilitation material choices.

In addition, this contract will provide the added benefit of evaluating the performance of select CalRecycle grant projects. The data used to develop the RHMA performance models will be collected from existing pavement projects throughout the state, and select CalRecycle grant projects will be included in the study.

II. WORK TO BE PERFORMED

The Contractor will develop RHMA performance models to predict the long-term performance of RHMA pavements (asphalt rubber and terminal blend) to promote their usage by state and local agencies via their PMS. The performance models will be developed through laboratory testing and field performance data.

III. TASKS IDENTIFIED

All work under this contract shall be performed in accordance with approved work plans developed by the Contractor and approved by CalRecycle. The work plans will be carried out through work orders issued under the contract.

Types of work anticipated include:

Task 1: Development of Performance Models

Develop performance models (curves) for RHMA pavements including conventional asphalt rubber and terminal blend hot mix, and rubberized hot mix asphalt with warm mix additives.

- A: Work with local agencies in the San Francisco Bay Area, Los Angeles Basin, and the Central Valley to document the performance of RHMA pavements. This task will include the evaluation of selected CalRecycle RAC grant projects.
- B: Work with Caltrans to document the performance of RHMA with warm mix additives.
- C: Perform laboratory and field testing on RHMA pavements (including those with warm mix additives) to correlate material parameters to field performance. This task may include the lease or purchase of testing equipment (pressure aging vessel, asphalt sample drill, four-point beam apparatus). The pressure aging vessel is used to simulate the condition of long-term aged binder in the field. The asphalt sample drill will be used to extract pavement core samples from existing roadways for laboratory testing. The four point beam apparatus will be used for long-term fatigue performance testing of RHMA, which is one indicator of long-term performance of the materials.

All equipment purchased with contract funds shall be the property of CalRecycle and must be returned to CalRecycle at the end of the contract term. However, at the conclusion of the Contract, if Contractor desires to keep any such equipment, CalRecycle may, at its discretion, consider selling any equipment purchased with contract funds to Contractor at fair market value.

Task 2: Dissemination of Knowledge

The purpose of this task is to write papers, articles, technical briefs, and interim reports to disseminate the knowledge of rubberized pavement performance. This may also include assisting local agencies and Caltrans in updating their

PMS. All papers, articles, briefs and reports shall be approved by CalRecycle prior to submission for publication, and such publication vehicles shall be selected in consultation with CalRecycle and approved prior to drafting of such documents, as set forth more specifically in the Work Orders for this task.

Task 3: Quarterly Progress Reports and Final Report

This task will consist of the preparation of quarterly reports to document the progress of the project, as well as a final report summarizing the activities and findings of Task 1 A-C.

IV. CONTRACT/TASK TIME FRAME

It is anticipated that this contract will be awarded in May 2012 and expire in May 2015. CalRecycle staff will develop a work order for each task under this contract and the deliverables and time frames for the respective activities will be specified in each work order.

V. COPYRIGHT PROVISION

The Contractor shall establish for CalRecycle good title in all copyrightable and trademarkable materials developed as a result of this Scope of Work. Such title shall include exclusive copyrights and trademarks in the name of the State of California, CalRecycle.

VI. CALIFORNIA WASTE TIRES

Unless otherwise provided for in this Scope of Work, in the event the Contractor and/or subcontractor(s) purchases waste tires or waste-tire derived products for the performance of this Scope of Work, only California waste tires and California waste tire-derived products shall be used. As a condition of payment under the agreement, the Contractor shall be required to provide documentation substantiating the source of the tire materials used during the performance of this Scope of Work to the contract manager.

VII. WASTE REDUCTION AND RECYCLED-CONTENT PRODUCT PROCUREMENT

In the performance of this Agreement, Contractor shall use recycled content, used or reusable products, and practice other waste reduction measures where feasible and appropriate.

Recycled-Content Products: All products purchased and charged/billed to the CalRecycle to fulfill the requirements of this contract shall be Recycled-Content Products

(RCPs), or used (reused, remanufactured, refurbished) products. All RCPs purchased or charged/billed to the CalRecycle to fulfill the requirements of the contract shall have both the total recycled-content (TRC) and the postconsumer content (PC) clearly identified on the products. Specific requirements for the aforementioned purchases and identification are discussed in the Terms and Conditions of the Contractual Agreement under Recycled-Content Product Purchasing and Certification.

The Contractor should, at a minimum, ensure that the following issues are addressed, as applicable to the services provided:

A. WRITTEN DOCUMENT PROVISION

All documents and/or reports drafted for publication by or for CalRecycle in accordance with this contract shall adhere to CalRecycle's *Guidelines For Preparing CalRecycle Reports (available upon request)* and shall be reviewed by CalRecycle's Contract Manager in consultation with one of CalRecycle's editors.

In addition, these documents and/or reports shall be printed double-sided on one hundred percent (100%) recycled-content paper. Specific pages containing full-color photographs or other ink-intensive graphics may be printed on photographic paper. The paper should identify the postconsumer recycled content of the paper (i.e., "printed on 100% postconsumer paper"). When applicable, the Contractor shall provide the contract manager with an electronic copy of the document and/or report for CalRecycle's uses. To the greatest extent possible, soy ink instead of petroleum-based inks should be used to print all documents

B. CONFERENCING PROVISION

The Contractor shall take any and all steps necessary to make sure that the event is a model for future recycling, waste prevention, diversion, buy recycled, and waste management events.

Paper Products: All paper products used to fulfill the requirements of this contract (nametags, badges, letters, envelopes, brochures, etc.) must contain at least 30% postconsumer recycled content fiber.

Re-usable Cups, Plates & Utensils: To the greatest extent possible, use re-usable/washable utensils, dishes, tableware, etc., rather than single-use disposable products.

Leftover Food/Beverages: All leftover food and/or beverages associated with the event will be donated to an established food donation outlet. Arrangements for the donation must be made prior to the date of the event. CalRecycle staff will assist the Contractor in identifying these donation outlets, if needed.

Recycling/Composting: Arrangements must be made with the venue, sponsor, or by contract, to provide adequate collection bins for recyclables, organics (food waste) or biodegradable materials, and trash (non-recyclables). The bins should

contain at least 30% post-consumer plastic. In addition, the Contractor shall work with the venue and/or sponsors to maximize diversion of the discarded materials.

Soy-based Printing Ink: To the greatest extent possible, soy ink instead of petroleum-based inks should be used to print all documents needed for the event.