

Pavement & Materials Partnering Committee
Work Product Scoping Document
Reclaimed Asphalt Pavement in Rubberized Hot Mix Asphalt – Gap Graded
April 24, 2020
(Revised August 10, 2020)

Task Group

Asphalt Task Group

Problem Process

- Annual
- Expedited
- Emerging Initiative

Title

Reclaimed Asphalt Pavement in Rubberized Hot Mix Asphalt –
Gap Graded

Statement of Effort/Improvement

The goal of this effort is to revise Caltrans Standard Specification (Section-39) to allow up to 10 percent Recycled Asphalt Pavement (RAP) in Gap Graded Rubberized Hot Mix Asphalt (RHMA-G). Caltrans and their Industry partners will work to develop a sustainable, biddable, and buildable specification that, when implemented, will not compromise pavement quality or service life. The initial effort will produce a non-Standard Special Provision (nSSP) for use on pilot projects.

Purpose

Allow the use of RAP in RHMA-G

Background

There continues to be growing interest from Legislators, Caltrans, and Industry stakeholders for the increased use of RAP in asphalt pavements. The use of RAP in asphalt pavements acts to preserve California’s dwindling aggregate reserves by reducing the amount of virgin aggregate in Hot Mix Asphalt (HMA). The RAP in RHMA-G contains a small amount asphalt binder within the RAP aggregate. Using RAP in RHMA-G will serve to divert RAP from local landfills. The use of RAP in RHMA-G will reduce the production of greenhouse gas in California by offsetting the energy consumption needed to produce virgin aggregates and asphalt binder.

This effort is consistent with Caltrans stated goals of providing a safe, sustainable, and efficient transportation system throughout California through innovation and leadership.

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Approach *(What approach will the Task Group use to attempt to ensure that the effort/improvement 1) will be Street-Ready, 2) will be tracked and managed to ensure expected performance and 3) will be implemented consistently statewide? This includes defining stakeholders to be included in the effort/improvement to attempt to ensure consistent implementation statewide as appropriate. What training/ guidance will be required? If “Pilot Projects” are to be used explain how in the approach.)*

Street Ready Assurance

The Work Product Group (WPG) will consist of Caltrans and industry partners. Caltrans WPG members will represent Caltrans Division of Construction (Construction), Materials Engineering and Testing Services (METS), and the Office of Asphalt Pavement. Members of industry will consist of various California asphalt pavement stakeholders. Three of the four industry members will represent vertically integrated asphalt producer/paving contractors with one member representing an HMA/RHMA producer.

The nSSP pilot project specifications must be biddable and buildable with appropriate risk assigned to Caltrans and the contractor. To ensure this, the draft specifications will be circulated among Caltrans and industry stakeholders, including District Materials Engineers (DMEs), following each WPG meeting. Comments and recommendations received from all stakeholders will be considered/discussed by the WPG members as deemed appropriate.

Additionally, to ensure the initial nSSPs are street ready, the WPG will:

- a) Review the current best practices related to the use of RAP in HMA,
- b) Implement national recommended standards established by the American Association of State Highways and Transportation Officials (AASHTO), American Standard for Testing and Materials (ASTM), or Caltrans test procedures as appropriate, and
- c) Create special testing and construction forms for pilot projects on an as-needed basis.

1. Pilot Projects

It is anticipated that the WPG will recommend the implementation of five to ten pilot projects following the completion of the RAP in RHMA-G nSSP. The WPG will recommend that pilot projects are evenly distributed through the state.

2. Pilot Project Evaluation

It is anticipated that a separate Scoping Document will be written and a WPG will be formed to monitor and evaluate the pilot projects to ensure:

- a) Specifications are biddable, buildable, and assign the appropriate level of risk to Caltrans and the contractor.
- b) Long-term performance is monitored annually or biannually through Caltrans

Pavement Condition Surveys to determine if pavement performance has been compromised, improved, or remains in a steady state throughout the implementation of the RAP in RHMA-G pilot project nSSPs.

It is anticipated that following the pilot project evaluations and revisions to the pilot project, nSSPs may be warranted prior to the full-scale implementation of a Standard Special Provision (SSP) or Revised Standard Specification (RSS).

3. Consistently Implemented

- a) The pilot project nSSPs will be submitted to the Caltrans Office of Contracts and Standards for review of formatting and language.
- b) Implementation of the WPG nSSP deliverable will be initiated via pilot projects following consensus approval from Caltrans mandatory stakeholders including the Federal Highway Administration.

4. Research Needs

It is anticipated that, based on the quantity of RAP in the RHMA-G, risk will be low from a pavement performance perspective. Literature reviews and reliance on existing best practices and current Caltrans/Industry knowledge base should be adequate to preclude the need for additional research. Should it be determined that additional research is warranted, the WPG will reach out to University of California Pavement Research Center (UCPRC) for their input and recommendations.

Team Members (Indicate Caltrans (CT) Chair and Industry Lead)

CT/Industry	Member Name	Division/Firm Name
CT	Kee Foo	Pavement Program
CT	Pete Spector	HQ Construction
CT	Guadalupe Magana	METS
CT	Clinton Edmiston	METS
Industry	Don Vivant	Sully-Miller (Industry Lead)
Industry	Art Trullio	George Reed Construction
Industry	Hongbin Xie	Granite
Industry	Cameron Richardson	Vulcan Materials

Objectives/Deliverables/Due Dates *(What is important to be done, what is the expected outcome, and when is each deliverable due and to who?)*

The expected deliverables for implementing RAP in RHMA-G are as follows:

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Short Term:

- Literature review focusing on current best practices (e.g. other state Departments of Transportation and industry best practices).
- Laboratory testing to verify RHMA-G containing various quantities of RAP comply with the existing quality characteristics requirements for RHMA-G.
- Develop pilot project nSSP with a maximum of 10 percent RAP in RHMA-G.

Long Term:

- RAP in RHMA-G Standard Special Provision (SSP) or Revised Standard Specification (RSS)

Details:

Milestones	Name - Responsible Party	Due Date (Start/Complete)*
Literature and Practice Review and Research	METS Rep and Industry Lead	09/01/20 – 12/01/21
Laboratory Testing	METS Rep and Industry Lead	09/01/20 – 01/01/21
Develop NSSP	Pvt Rep and Industry Lead	01/01/21 – 06/01/21
Pilot Projects	Cons Rep and Industry Lead	06/01/21 – 12/01/21
Data Collection and Evaluation	New Data Evaluation WPG	12/01/21 – 09/01/22
Specification	Pvt Rep and Industry Lead	09/01/22 – 10/01/22
Submit RSS to OCCS	Pvt Rep	10/01/22 – 12/01/22
Final Report	Asphalt STG, METS Rep, and Industry Lead	12/01/22 – 03/01/22

*Dates will be adjusted based on Executive Committee approval of the scoping document.

Resources To Develop and Implement (Staff hours and expenses.)

Milestones	Caltrans Hours	Industry Hours
Literature and Practice Review and Research	250	100
Laboratory Testing	500	100
Develop NSSP for Maximum Ten Percent of RAP in RHMA-G	200	200
Pilot Projects	200	80
Data Collection and Evaluation	200	
Specification	100	100
Submit RSS to OCCS	50	5
Final Report	80	40
Other Resources	300	300

Benefits *(For example, increased life cycle, reduced costs, reduced risk factors, compliance with Caltrans goals etc.. Quantify benefits and define success and performance measures.)*

The following benefits are expected to yield results by the completion of this effort:

- Extends California’s dwindling aggregate reserves by reducing the amount of virgin aggregate in RHMA-G.
- Provides for the re-use of residual asphalt binder within the RAP aggregate, which would potentially replace virgin binder demand.
- Serves to divert RAP from local landfills.
- Reduces creation of greenhouse gas by offsetting the energy consumption needed to produce virgin aggregates and asphalt binder.
- Reduced cost for RHMA-G by reducing the demand of virgin aggregates.
- Supports Caltrans stated goals of providing a safe, sustainable, and efficient transportation system throughout California through innovation and leadership.
- Produces value added to the RHMA-G product without sacrificing pavement performance.

Estimated Impact to Caltrans and Contractor - *(What are the impacts to policy, specifications, construction practices, and stakeholders? Include an estimate to overall increase/decrease in project cost, District/HQ resources at project level, and Contractor/supplier impact. Estimate increased/reduced risk factors for Caltrans and Contractor.)*

Impacts

- Demonstrates Caltrans commitment to provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability.
- Revised specifications will allow for the use of RAP in RHMA.
- Reduced overall cost of virgin aggregates in RHMA-G.
- Reduction in RHMA-G cost based on reduction in virgin aggregate (savings TBD).
- Extends life of virgin aggregate resources in California.
- Risk: Not having follow up evaluation after the completion of pilot projects to document pavement performance.
- Stakeholders that will be affected by this new specification include:
 - Aggregate Suppliers – Impact: moderate
 - RHMA-G Producers – Impact: moderate
 - Paving Contractors – Impact: minimal
 - Caltrans METS – Impact: minimal
 - Caltrans DMEs – Impact: minimal

Impediments to Completion of Deliverables – *(Identify impediments and potential mitigation measures to address impediments.)*

- Impediment: Available Caltrans and industry resources to perform necessary tasks in connection with completion WPG deliverable.
 - Mitigation: Commit people and resources towards the effort
- Impediment: Lack of good collaboration among Caltrans and industry stakeholders.
 - Mitigation: Members of work product group must have a common vision of objective(s), be committed to a partnering relationship, and communicate with their respective stakeholders to ensure there is widespread buy-in throughout the process.
- Impediment: Shifting of key personnel within Caltrans and Industry during the specification development process.
 - Mitigation: Work to maintain stable member participation throughout the process.
- Impediment: Loss of continuity for WPG objective(s).
 - Mitigation: Ensure the data evaluation team has a clear understanding the WPG objective(s).
 - Mitigation: Ensure final RAP in RHMA-G SSP or RSS is consistent with WPG objective(s).

Recommendation and Approval

This scoping document for RAP in RHMA-G was prepared by Asphalt Subtask Group to address a priority issue with statewide significance and is within the Pavement & Materials Partnering Committee (PMPC) mission as described in the PMPC Charter.

The Asphalt Subtask Group members have determined the scope, resources required, and timeline for delivery of the project deliverables. A signature here indicates that the Asphalt Task Group and PMPC Executive Committee members are committed to providing the resources to support this effort within the prescribed timeframes. Furthermore, it is everyone's responsibility to ensure that the final effort/improvement will be:

- 1) Street-Ready,
- 2) Monitored and reported for performance, and
- 3) Successfully implemented statewide as may be appropriate.

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Scoping Document Recommendation and Industry Concurrence by (name and date):

Caltrans Name (Recommendation)	Date	Industry Name (Concurrence)	Date
Tom Pyle <i>(digitally signed)</i>	08/18/20	Pat Imhoff <i>(digitally signed)</i>	08/18/20
Caltrans Task Group Chair		Industry Task Group Lead	
Ken Solak <i>(digitally signed)</i>	08/17/20	Phil Reader <i>(digitally signed)</i>	08/18/20
Caltrans Task Group Member		Industry Task Group Co-Member	
Jeremy Peterson-Self/Interim <i>(digitally signed)</i>	08/18/20		
Caltrans Task Group Member			

Scoping Document Approval and Industry Concurrence by (name and date):

Caltrans Name (Approval)	Date	Industry Name (Concurrence)	Date
Sergio Aceves 	8/20/20	Brandon Milar 	8/20/20
Caltrans PMPC Executive Committee – Chair Pavement Program		Industry PMPC Executive Committee	
Ray Hopkins 	8/20/20	Charley Rea 	8/20/20
Caltrans PMPC Executive Committee Headquarters Construction		Industry PMPC Executive Committee	
Kevin Keady 	8/27/20		
Caltrans PMPC Executive Committee Structures Policy and Innovation			
Tim Greutert 	8/20/20		
Caltrans PMPC Executive Committee Materials Engineering and Testing Services			

Approval Date: 8/27/20