

Memorandum

*Making Conservation
a California Way of Life*

To: DISTRICT DIRECTOR
DEPUTY DIRECTOR
DIVISION CHIEFS

Date: October 2, 2019

From: JANICE BENTON
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Subject: **DESIGN INFORMATION BULLETIN 81-02**

Design Information Bulletin (DIB) 81 "Minor Pavement Rehabilitation Capital Preventive Maintenance (CAPM) Guidelines" has been updated to version 81-02 and is now available on the Division of Design DIB external website at <<https://dot.ca.gov/programs/design/design-information-bulletins-dibs>>. This DIB is effective as of the date of this memorandum and is to be implemented with the procedures in the *Highway Design Manual Index 82.5* "Effective Date for Implementing Revisions to the Design Standards."

BACKGROUND

Federal-aid funding provisions allow for projects to accomplish preventive maintenance activities of the pavement. This work provides cost effective treatments to an existing roadway system without increasing pavement structural capacity. Geometric enhancements are not included, and the work cannot degrade any existing safety or geometric aspects of the roadway facility. Projects that propose improvements beyond the DIB 81 guidance will be processed using DIB 79.

Since the issuance of the previous version of DIB 81, the California Department of Transportation (Caltrans) has implemented various policy and procedural updates for district design delegation, project initiation documents, traffic safety devices, complete streets, and asset management. Additionally, State law and policies have amended the process for management and selection of State Highway Operation and Protection Program (SHOPP) projects for Caltrans.

These updates are incorporated in this revision and is consistent with the current process for scoping SHOPP projects.

SUMMARY OF SIGNIFICANT CHANGES

- Consistent with the process for district design delegation and the involvement with headquarters and district/region personnel.
- Updated with the Manual for Assessing Safety Hardware (MASH) criteria.
- Included the Complete Streets concept and scoping requirements.
- Included the process for asset management and scoping.
- Process for applying design standards and guidance for design standard decision documents.
- Added glossary of abbreviations.

Project specific applicability and questions should be referred to the Project Delivery Coordinators or the District Pavement Program Advisors.

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DESIGN INFORMATION BULLETIN NUMBER 81-02

**California Department of Transportation
Division of Design - Office of Standards and Procedures
Division of Maintenance - Pavement Program**

**Minor Pavement Rehabilitation Capital Preventive
Maintenance (CAPM) Guidelines**

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October 2, 2019

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1.0 INTRODUCTION

1.1 Minor Pavement Rehabilitation (Capital Preventive Maintenance) for the State Highway System

This Design Information Bulletin (DIB) provides guidance on design procedures and standards for minor pavement rehabilitation Capital Preventive Maintenance (CAPM) projects, including how to scope cost effective operational improvements and upgrades to other roadway assets. Thus, this DIB incorporates the concepts of preventive maintenance and asset management.

This DIB supplements the highway design guidance and standards provided in the California Department of Transportation *Highway Design Manual (HDM)*. Although design standards are not explicitly stated in this DIB, design standards that are used will be in the same manner as 3R projects (see *DIB 79*) and as described in Section 2.3 of this DIB. Any documentation of design decisions will be in the same manner as defined in *HDM Chapter 80*.

This DIB is not a textbook or a substitute for engineering knowledge, experience or judgment. Many of the instructions given herein are subject to amendment as conditions and experience may warrant. Unique situations may call for variation from the policies and procedures described in this document, subject to Division of Design or delegated approval, or such other approval as may be specifically provided for in the text.

Additional guidance to consider include the *American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide* and *AASHTO "Highway Safety Design and Operations Guide - Chapter 4: "Rural Highways."* Copies of these publications can be ordered through the AASHTO website. Other available resources that should be reviewed include:

- *DIB 79: "Design Guidance and Standards for Major Pavement Roadway Rehabilitation (2R and 3R) Projects and Certain Other Non-Freeway Projects"*
- *DIB 82: "Pedestrian Accessibility Guidelines for Highway Projects"*
- *Storm Water Quality Handbook "Project Planning and Design Guide"*
- *Traffic Safety Systems Guidance*
- *California MUTCD*
- *Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians*, issued 2010, which is available through the Headquarters Division of Traffic Operations
- *HDM Pavement Engineering Chapters 600 through 670*
- *Concrete Pavement Guide (CPG)*
- *Project Development Procedures Manual (PDPM)*
- *Automated Pavement Condition Survey (APCS) Manual*
- *Life-Cycle Cost Analysis (LCCA) Procedures Manual*

1.2 Minor Pavement Rehabilitation (Capital Preventive Maintenance)

Minor pavement rehabilitation (CAPM) is a planned pavement management strategy to make cost-effective repairs on existing roadways in generally fair condition with considerable remaining service life (15 – 30 years). Minor pavement rehabilitation (CAPM) strategies are non-engineered pavement structure designs typically applied to moderately extensive existing structural distress that do not alter existing roadway geometric features. The goal of minor pavement rehabilitation (CAPM) is to extend pavement service life about 5 – 10 years, before costlier major pavement rehabilitation (2R or 3R) is required.

Cost effectively extending pavement service life and improving smoothness are key elements of minor pavement rehabilitation (CAPM) projects. Minor pavement rehabilitation (CAPM) strategies should be readily constructible (refer to Section 3.0 of this DIB) to minimize disruptions to motorist, bicyclist, pedestrian, and transit operations.

The asset management concept is integrated with this DIB. Thus, a performance-based approach is utilized based on performance objectives and assets. This approach together with Departmental goals should result in pavement projects with added features that are feasible, practical, and cost-effective. In general, the majority of the work will dictate the anchor. The work included in a minor pavement rehabilitation (CAPM) anchor project should not propose major facility upgrades but should include all appropriate items of work as discussed in this DIB and within the funding constraints. Projects with combined extensive satellite asset work greater than half the estimated project cost may not be suitable pavement anchor projects. When minor pavement rehabilitation (CAPM) satellite work is part of another project anchor, limitation of other assets or features described in this DIB are not applicable. See *DIB 79* Section 1.4 for information on the appropriate guidance to follow when there are minor and major pavement rehabilitation strategies within the same project limits.

1.2.1 Capital Preventive Maintenance Program (20.XX.201.121)

Minor pavement rehabilitation (CAPM) projects are programmed in the 20.XX.201.121 CAPM (121) program. Localized repairs for more severe distress conditions should be included in the scope of minor pavement rehabilitation (CAPM) projects, but more extensive failures that require strategies beyond those described in Section 2.1.1 may be more suited for major pavement rehabilitation (2R or 3R). Coordinate with the HQ Pavement Program Advisor and District Maintenance Engineer throughout project development when analyzing distress condition data and evaluating alternative pavement project strategies. The Division of Maintenance Pavement Program website at <https://maintenance.onramp.dot.ca.gov/paveprogram/pavement-program> also provides guidance on pavement distress evaluation and procedures to develop pavement projects.

1.3 Other Related Pavement Programs

1.3.1 Roadway Rehabilitation Program (20.XX.201.120 or 20.XX.201.122)

Pavement distress needs more extensive than described in in Section 2.1.1 may require major pavement rehabilitation (2R or 3R), which includes strategies such as thick HMA-A

overlays > 0.25', full-depth reclamation, lane replacement, or crack, seat, and HMA overlay.

Some project segments and multi-lane roadways may exhibit variable distress conditions that can be cost effectively addressed using a combination of pavement strategies. Projects with extensive major pavement rehabilitation (2R or 3R) needs may also utilize some pavement preservation or minor pavement rehabilitation (CAPM) strategies but should follow the guidance in *DIB 79*. Consult the HQ Pavement Program Advisor and refer to the *HDM* and *DIB 79* for more information.

1.3.2 Pavement Preservation (HM-1 Program)

Pavement preservation primarily consists of nonstructural preventive and corrective maintenance strategies funded under the HM-1 Highway Maintenance Program. The goal of pavement preservation is to maintain existing pavement in generally good condition before more expensive rehabilitation is required. Some pavement engineering strategies for both preservation and minor pavement rehabilitation (CAPM) are similar but are typically applied to segments with different distress extents.

Pavement preservation strategies may be used on SHOPP projects in combination with more extensive minor (CAPM) or major pavement rehabilitation (2R or 3R) work, such as preserving the inside lanes of multi-lane routes or individual interchange ramps or connectors. However, stand-alone preservation projects on pavement in generally good condition are not funded by the SHOPP or addressed by this DIB. For more information, consult with the HQ Pavement Program Advisor and refer to *HDM Topic 612* and the annual Highway Maintenance Program Work Plan memorandum.

1.4 Minor Pavement Rehabilitation (CAPM) Scope

Minor pavement rehabilitation (CAPM) projects are expected to:

- Fill the pavement management gap between pavement preservation (maintenance) and major pavement rehabilitation (2R or 3R) strategies.
- Extend service life with well-timed, cost-effective minor pavement rehabilitation (CAPM) strategies.
- Correct minor structural and roughness pavement distress.
- Maintain the facility in safe and serviceable operating conditions.
- Include appropriate preservation and repair strategies for non-mainline pavement such as ramps, connectors, and shoulders.
- Reduce maintenance worker exposure by repairing deteriorated pavement segments.
- Maximize federal funding participation using Capital Project funding in a coordinated pavement management program.
- Perpetuate most existing conditions and facilities in fair to good condition, including traffic markings, signs, and safety devices except as discussed in Section 4.0. Other non-pavement satellite assets with established needs should only require moderate work

and not exceed, when combined, half the total project cost.

- More extensive or expensive needs may indicate the project is not suitable as a minor pavement rehabilitation (CAPM) anchor. Alternatively, if feasible it may be preferable to defer the work and pursue as future major pavement rehabilitation (2R or 3R) projects when the predicted pavement distress warrants that level of investment in the roadway facility. Refer to Section 4.0 for more details about cost effective minor pavement rehabilitation (CAPM) project upgrades to safety, and other assets.
- Use cost analysis to support pavement management decisions, such as analyzing the cost effectiveness of minor (CAPM) versus major pavement rehabilitation (2R or 3R), see Section 2.2.2. For example, comparing individual slab replacement to continuous concrete lane replacement for segments with either:
 - Existing distress from 7 – 20% per lane
 - Previously replaced slabs > 8% per lane
- Follow the guidance in *DIB 79 Sections 2.1.4 and 2.1.5*

2.0 PROCESS

2.1 Pre-scoping Activities

The District Pavement Managers/Program Advisors submit project candidates to the Headquarters (HQ) Pavement Engineer/Program Advisor to develop the 10-year SHOPP plan. The candidate list should be submitted as early as possible in the annual project development cycle, usually in late winter/early spring, to assure identification and refinement of the best candidate projects before the development of scoping documents.

Project strategies that exceed these DIB guidelines, such as overlays thicker than indicated in Section 3.2 or digouts exceeding 20% of the project cost, should be discussed with the HQ Pavement Program Manager and DOD Project Delivery Coordinator (for non-delegated projects per the District Design Delegation Agreement). Otherwise, the project will be considered major pavement rehabilitation (2R or 3R) and is subject to the guidance in *DIB 79* and design standard decision documentation for nonstandard features.

2.1.1 Pavement Distress Criteria

Minor pavement rehabilitation (CAPM) generally treats asphalt and concrete pavement segments with:

- $10\% \leq$ Alligator B cracking $\leq 30\%$
- $3\% \leq 3^{\text{rd}}$ Stage cracking $\leq 7\%$ by lane requiring slab replacement¹
- Faulting severity > 0.15" with extent > 25%
- MRI > 170 inches/mile²
- Other types of extensive minor concrete distress (non-structural cracking, spalling, settled corner cracks, etc.)

Concrete Pavement Criteria

¹ For concrete pavement, individual slab replacement should only restore serviceability due to moderately extensive distress such as severe 3rd Stage cracking, severe spalling, or corner cracking with settlement. Project segments with more extensive distress, including 1st Stage cracking, or a high number of previously replaced slabs > 8% should be planned as a 2R or 3R project. Refer to *DIB 79, CPG Chapters 320 and 400* for more detailed information.

² Grinding, grooving, or continuous profile grinding work should only be considered where MRI or faulting thresholds are met. Grinding individual slab replacements and existing areas of localized roughness can be considered.

More severe distress conditions may require more robust repair strategies, such as to address localized failures. More extensive distress conditions that exceeds these severity thresholds may require a major pavement rehabilitation project (2R/3R). Consult the HQ Pavement Program Advisor and refer to *DIB 79* for more information.

2.1.2 Coordinated Pavement Management Strategies

Constructing a minor pavement rehabilitation (CAPM) project while planning a major pavement rehabilitation (2R or 3R) project can be an acceptable pavement management approach if the engineering strategies are coordinated. An interim minor pavement rehabilitation (CAPM) strategy may be appropriate to address a project segment with extensive existing structural distress if follow up major pavement rehabilitation (2R or 3R) work is programmed as a long-lead project due to delivery issues. Minor pavement rehabilitation (CAPM) projects in advance or in lieu of major pavement rehabilitation (2R or 3R) will affect the predicted performance and optimal project timing, therefore the HQ Pavement Program Advisor must be consulted.

Minor pavement rehabilitation (CAPM) projects may also be appropriate and cost effective on Class 3 roads (see *SHSMP*) where the facility is beyond the capacity of maintenance preservation strategies to repair. Coordination with the HQ Pavement Program Advisor, District Pavement Program Advisor, and Division of Design (DOD) Project Delivery Coordinator is required if no future major pavement rehabilitation (2R or 3R) upgrades are planned.

Successive minor pavement rehabilitation (CAPM) strategies may be appropriate for a project segment depending on:

- Pavement age and performance history. Minor pavement rehabilitation (CAPM) is most cost effective for existing roadways with considerable remaining service life (15 – 30 years), but this is determined subjectively using engineering judgment. For asphalt concrete pavement with adequate performance history, successive minor pavement rehabilitation (CAPM) projects are viable. However, for aged concrete pavement with 2 or more previous minor pavement rehabilitation (CAPM) strategies, major pavement rehabilitation (2R or 3R) is likely the preferred strategy for outside lanes at the end of their service life.

- Distress conditions. Minor pavement rehabilitation (CAPM) is typically appropriate for existing roadway segments with moderately extensive structural distress according to the criteria in Section 2.1.1. For concrete pavement, the extent of previously replaced slabs (which deteriorate at a different rate) should also be considered to determine whether minor (CAPM) or major pavement rehabilitation (2R or 3R) is most cost effective.
- Traffic study analysis. If a minor pavement rehabilitation (CAPM) project can readily address cost effective safety or operational improvements identified by the district Traffic Safety unit, the improvements should be considered in the project scope (refer to Section 4.0 for examples). If including operational or safety improvements will create a new nonstandard feature, consult with the DOD Project Delivery Coordinator or District Design Liaison early if contemplating the use of a nonstandard design feature. See Section 2.3 of this DIB.

2.2 Development of Project Initiation Documents (PID)

A Project Initiation Document (PID) is used to nominate a major SHOPP project for programming. The Project Initiation Report (PIR) fulfills the PID requirement. Depending on the scope of satellite asset work, most minor pavement rehabilitation (CAPM) projects should be Categorically Exempt (CE) projects with little or no environmental impact and work within the existing right of way. The SHOPP project selection process is established by the district Project Nomination Team comprised of the district Asset Manager, the district SHOPP Advisors, functional unit representatives and the SHOPP Program Managers.

The district is responsible for developing the PIR. Minor projects do not require a PIR and become part of the District's annual Minor Program. Major SHOPP projects are submitted to the CTC individually for adoption. Guidance for preparation of the PIR is located on the Office of Program and Project Planning website at: <http://www.dot.ca.gov/hq/tpp/offices/opsc/shopp-guidance.html>. The draft PIR is submitted to both the HQ and District Pavement Program Advisors for comments. Also, PIRs that have been approved for 2 years should be re-evaluated before delivery to validate the proposed pavement repair strategy. The re-evaluation should consider the latest automated pavement condition survey (APCS) data and include a new Scoping Team Field Review.

2.2.1 Scoping Team Field Review

All minor pavement rehabilitation (CAPM) candidate projects should have a Scoping Team Field Review after initial development of the draft PIR to refine the project scope and determine appropriate repair strategies depending on pavement needs, traffic operations, and design standards.

Scoping Team Field Reviews should include the HQ Pavement Program Advisor or the District Pavement Program Advisor. If the HQ and District Program Advisors, District Design Liaison, or DOD Project Delivery Coordinator (for non-delegated projects per the District Design Delegation Agreement) do not attend the field review, they must be

consulted before the project scope is finalized. Recommended district staff attendance and review resources are listed in Attachment A, Minor Pavement Rehabilitation (CAPM) Scoping Team Field Review Checklist. Field reviews should be scheduled to encompass as many different project locations as possible. Any project not reviewed by the HQ Pavement Program Advisor is at risk of being disputed if scoping issues are identified.

2.2.2 Cost Analysis

Formal Life Cycle Cost Analysis (LCCA) according to the Life Cycle Cost Analysis Procedures Manual is not required for minor pavement rehabilitation (CAPM) projects. However, some cost analysis is required to support effective pavement management decisions, such as analyzing the cost effectiveness of minor (CAPM) versus major pavement rehabilitation (2R or 3R). A comparison of different pavement products or strategies should be done to support project scoping and life cycle planning during the preparation of the PIR. The results of the cost analysis should be documented in the PIR (see *PDPM Chapter 8*).

More robust cost analysis is needed to scope rehabilitation work on older concrete pavement segments with either:

- Existing distress from 7 – 20% per lane
- Previously replaced slabs > 8% per lane

A minor pavement rehabilitation (CAPM) individual slab replacement strategy with short service life and low initial cost should be compared to a major pavement rehabilitation (2R or 3R) strategy such as lane replacement, which typically has a 40-year design life.

2.3 Design Guidance and Documentation of Design Exceptions

Minor pavement rehabilitation (CAPM) projects that are consistent with the guidelines in this DIB do not require design standard decision documentation for existing nonstandard geometric features unless the project scope degrades those features or creates new deviations. Guidance for design standards will be from *DIB 79 Section 3.0*. The bold and underlined pavement engineering design standards in *HDM Chapters 600 through 670* still apply to minor pavement rehabilitation (CAPM) projects.

Minor pavement rehabilitation (CAPM) projects are not intended to change existing geometric features. However, added assets and features as described in Section 4.0 may necessitate the documentation of nonstandard features. The delegated holder of design standard exception approvals must be consulted if the project proposes to create deviations from geometric design standards. Typically, these exceptions include items such as reduced shoulder width due to installation of standard dike, guardrail or bridge approach rail, and increased shoulder cross slope where it conforms to the existing curb and gutter.

3.0 MINOR PAVEMENT REHABILITATION STRATEGIES

All minor pavement rehabilitation (CAPM) projects should:

- Use readily constructible pavement strategies listed in *HDM Indices 624.2* (for rigid

pavement preservation) and 634.2 (for flexible pavement preservation), and the Concrete Pavement Guide available on the Pavement Program website at <https://maintenance.onramp.dot.ca.gov/paveprogram/pavement-program>.

- Primarily treat pavement with minor structural distress.
- Extend pavement service life for 5-years minimum.
- Improve pavement ride quality and serviceability.
- Reduce maintenance effort needed on the affected section of State highway.
- Maintain existing geometric features and not degrade any operational or geometric aspects of the facility.
- Include cost-effective, minor enhancements as discussed in Section 4.0
- Comply with Americans with Disabilities Act (ADA) by:
 - Reconstructing existing curb ramps to meet current accessibility standards; and
 - Adding missing curb ramps required for pedestrian access. See *DIB 82* for the complete ADA guidance.

3.1 Concrete Pavement

Minor pavement rehabilitation (CAPM) strategies for concrete pavement include:

- Individual slab replacement according to the criteria in the *Concrete Pavement Guide Chapter 320*.
- Continuous profile grinding to correct roughness from curling, warping, faulting, individually replaced slabs, areas of localized roughness, or MRI > 170 inches/mile.
- Resealing longitudinal and transverse joints.
- Routing and sealing longitudinal or transverse cracks in JPCP from ¼ to ½ inch wide without faulting or settlement.
- Dowel bar retrofitting transverse joints or cracks (includes continuous profile grinding).
- Cold planing and resurfacing flexible pavement shoulders and interchange ramps.

3.2 Flexible Pavement

Minor pavement rehabilitation (CAPM) strategies are non-engineered pavement structure designs typically applied to moderately extensive existing structural distress. Deflection studies are not required but may be requested based on project-specific factors such as performance history. For flexible asphalt concrete pavement surfaces with MRI ≤ 170, the standard overlay design thicknesses are:

- 0.15' RHMA-G
- 0.20' HMA-A, including conventional asphalt or any other department-approved modified binder.

Notes:

1. A 0.20' RHMA-G overlay or pavement interlayer may be appropriate under certain circumstances with HQ Pavement Program Advisor or Pavement Program Manager concurrence.

2. A 0.10' thick Open Graded Friction Course (OGFC) may be added on top of the overlay design thickness but may not be substituted for an RHMA-G or HMA-A layer.
3. For flexible pavement with MRI > 170 the standard overlay design thickness is 0.25' placed in 2 lifts, which will require an NSSP. HMA leveling course can also be specified, but it is not considered part of the design overlay thickness. If the existing ride quality cannot be adequately addressed within the parameters of this DIB, the project should be deferred until major pavement rehabilitation (2R or 3R) is warranted.
4. In locations constrained by maintaining the existing profile grade or vertical clearance, the existing pavement may be cold planed to match the design overlay thickness.
5. Undesirable surface materials such as bleeding seal coats or excessive crack sealant should be removed from the existing pavement before paving. Alternatively, a leveling course may be used to separate the overlay from undesirable materials.

Preparation of the existing pavement surface is critical to performance, but should not exceed 20% of the pavement structure cost. District Pavement Managers are encouraged to use Maintenance resources, including state forces, to lower project costs and improve performance. For example, cracks > 1/4" wide should be sealed prior to overlaying, preferably by state maintenance forces a few months before paving to allow for curing.

HDM 635.2(10) provides additional guidance on preparing existing pavement surfaces for an overlay. Not all Alligator A and B cracking requires digouts, which are typically warranted for areas of severe surface distress such as:

- Severe Alligator B cracks > 1/2" wide,
- Rutting greater than 0.08'
- Delaminated, loose, or raveling pavement.

4.0 COST-EFFECTIVE ENHANCEMENTS TO MINOR PAVEMENT REHABILITATION (CAPM) WORK

4.1 Traffic Operation Review

District Traffic Operations will perform a review of the traffic operations aspects for all minor pavement rehabilitation (CAPM) projects. This review should occur early in the process as part of scoping the project described in Section 2.2.1 of this DIB. The goal of this review is to evaluate and identify easily implemented, cost-effective traffic operation enhancements that should be included in the minor pavement rehabilitation (CAPM) project. These potential enhancements should be limited to the following:

- Updating the signing and pavement delineation to current standards.
- Maintaining, adding, replacing or eliminating rumble strips.
- Addressing collision patterns related to wet weather.
- Upgrading metal beam guard railing, thrie beam barrier, and end treatments to current hardware design.
- Sidewalk, driveway or bicycle facility improvements.

Recommended enhancements will be incorporated in the project if the inclusion does not change the target construction season. The Project Development Team guides project development decisions made on this issue. The enhancements also must not significantly increase the project cost. When a recommended enhancement cannot be included on a minor pavement rehabilitation (CAPM) project, the Project Engineer must document the decision made in the Project History File and inform the district Traffic Unit why the identified enhancement will not be included in the project.

4.2 Other Non-Pavement Work Appropriate on CAPM Projects

Any work that affects a traffic safety device should involve consultation with the District Traffic Safety Systems Coordinator, see the *Traffic Safety Systems Guidance*. In addition to the ADA requirements previously mentioned in Section 3.0 of this DIB and the traffic operation enhancements mentioned above, the following non-pavement work is appropriate on a minor pavement rehabilitation (CAPM) project:

- Metal Beam Guardrail (MBGR) height is to be adjusted to meet the indicated tolerances in the *Traffic Safety Systems Guidance* or is to be replaced with the Midwest Guardrail System (MGS) if the tolerances cannot be met. Consult with the District Traffic Safety Systems Coordinator to identify and discuss height adjustments.
- Bridge approach guardrail and nonstandard sections of MBGR shall be upgraded to current approved hardware design.
- End treatments for all in-place MBGR and MGS shall be upgraded to MASH 2016 (or the latest crashworthiness criteria adopted by Caltrans) Crash Test Standard compliance. Refer to the list of approved end treatments and attenuators for specific products on the Division of Traffic Operations – Traffic Safety, Traffic Safety Devices webpage on the Department Intranet website at: <https://traffic.onramp.dot.ca.gov/safety-devices-approved-products>.
- If the height of thrie beam barrier is reduced and the current standard height cannot be maintained with a 10:1 or flatter slope in front of the barrier, then the barrier must be reconstructed to the minimum standard height.
- If the height of Type 50 concrete barrier is reduced, it should be replaced with Type 60M concrete barrier.
- Crash Cushions shall be upgraded to MASH 2016 (or the latest crashworthiness criteria adopted by Caltrans) Crash Test compliance. Refer to the list of approved crash cushions for specific products on the Division of Traffic Operations webpage at: <https://traffic.onramp.dot.ca.gov/safety-devices-approved-products>.
- Existing dike that does not meet current standards (*HDM Topic 303*) should be replaced with the appropriate standard dike. Proposed dike not meeting current standards requires design standards decision document approval. The designer must consult with the District Traffic Safety Systems Coordinator when curbs or dikes are identified along guardrail end treatments and crash cushions to determine if the curbs or dikes should be modified.
- District traffic operations should address these features for possible replacement: All existing traffic pavement markings, signs (not sign structures) and damaged loop

- detectors. See the *California MUTCD* for vehicle, bicycle and motorcycle loop detection guidance.
- Shoulder backing material shall be specified in the project to avoid pavement edge drop-offs. See Shoulder Backing Guidelines on the Caltrans Pavement Program Technical Guidance website on the Department Intranet at https://maintenance.onramp.dot.ca.gov/downloads/maintenance/files/pave_program/docs/ShoulderBackingGuideline.pdf.
 - The combined total cost of drainage and other assets or features that do not exceed half of the total cost of the project without significant schedule delay are acceptable additions to the project.

5.0 GLOSSARY OF ABBREVIATIONS

2R	Resurfacing and restoration (also known as Pavement Focused)
3R	Resurfacing, restoration and rehabilitation
AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act of 1990
APCS	Automated Pavement Condition Survey
BMP	Best Management Practices
CAPM	Capital Preventive Maintenance
CE	Categorically Exempt
CPG	Concrete Pavement Guide
DIB	Design Information Bulletin (current version)
DOD	Division of Design
HDM	Highway Design Manual
HQ	Headquarters
HM	Highway Maintenance
HMA	Hot mixed asphalt
JPCP	Jointed plain concrete pavement
LCCA	Life-Cycle Cost Analysis
LCP	Life Cycle Planning
MASH	Manual for Assessing Safety Hardware
MGS	Midwest Guardrail System
MBGR	Metal beam guardrail
MRI	Mean Roughness Index
MUTCD	Manual on Uniform Traffic Control Devices
NSSP	Nonstandard special provision
OGFC	Open graded friction course
PDPM	Project Develop Procedures Manual
PIR	Project Initiation Report
PR	Project Report
RHMA	Rubberized hot mixed asphalt
SHOPP	State Highway Operation and Protection Program
SHSMP	State Highway System Management Plan

Minor Pavement Rehabilitation (CAPM) Scoping Team Field Review Checklist

Team Members***

- District Asset Manager
- HQ Pavement Program Advisor (121 Program)**
- District Pavement Program Advisor (121 Program)*
- Project Engineer *
- Materials Engineer
- Traffic Safety
- Project Manager
- Field Maintenance
- Environmental
- Construction
- District Bicycle and Pedestrian Coordinator
- District Design Liaison**

* Required attendance

** Consultation required if they do not participate in the field review

*** Coordination with the District Safety Review Committee [see *HDM* Index 110.8 (1)] and their involvement on the scoping team may expedite the project delivery process.

Information/Data to Bring on the Field Review

- Team Member Sign-in sheet (to be attached to approved PIR or PR)
- Major Maintenance Plan
- SHOPP 10-Year Plan
- Draft PIR or draft PR (bring enough copies for the field review team)
- Pavement Condition Report (PCR)
- Project Cost Estimate
- Caltrans and/or Local Bicycle and Pedestrian Plan (if applicable)
- Highway Log
- *DIBs 81 and 82*

Research/Review Before the Field Review

- Non-motorized User Needs: bicyclists and pedestrians (including ADA)
- Complaints from the Public (ADA, bicyclists, pedestrians, etc.)
- Utilities, Underground Caltrans electrical and irrigation facilities
- Environmental Issues (Potential Delays)
- Vegetation Control Needs
- Project Limits