

MaineDOT Plant Mixed Recycled Asphalt Pavement (PMRAP) Program

rev. Feb. 19, 2016

RJCrawford

Introduction

In September, 2013, a subcommittee of the Engineering Council was formed at the direction of the Chief Engineer. The subcommittee was tasked with identifying project expectations for the PMRAP program. The focus of the expectations is on the Customer Service Levels (CSLs) for Highway Corridor Priorities (HCP) 3 & 4. These corridors are primarily classified as major collectors and minor collectors in the Federal Functional Classification. Currently, the State of Maine has a need of 474 miles of Rehabilitation/Reconstruction on HCP 3's. The need on HCP 4's is an additional 450 miles for Rehabilitation. Using the typical Reconstruction/Rehabilitation cost/mile for these roadways of \$1,000,000/mile, the cost for these improvements are just under \$1,000,000,000 (one billion dollars). A majority of these roadways have traffic volumes less than 4000 vehicles/day. Given the current funding levels and the need to continue to improve and maintain our HCP 1's and 2's, the Department's ability to rebuild the HCP 3's and 4's to typical state standards in a reasonable timeframe is unachievable.

The Department has instituted a PMRAP program using a State owned pugmill since 2008. This program has accomplished many miles of improvements to the transportation system at a cost in the range of \$200,000 to \$300,000 per mile. Historically, this program was used as a pavement strengthening maintenance activity associated with our Light Capital Paving program (LCP), primarily focusing on core roadway improvements, with little attention on the impacts outside the pavement.

Moving forward, the program will define the expected improvements to the roadway as well as elements adjacent to the roadway. Focus will be on improvements to safety, road conditions, and serviceability beyond its current condition. Strict adherence to standards will be replaced with sound engineering judgment. Prudent risk through engineering judgment will be weighed against standards based on customer expectation and traffic volume. Particular focus for Engineering Judgment shall be the context of the roadway, rural conditions versus urban conditions, posted speed limit, truck % of AADT, horizontal and vertical alignment.

Upon completion of the PMRAP project, a determination will be made regarding placing that portion of the roadway segment in the Pavement Preservation Program. With the added expectation of improvements described below, the expected per mile cost will increase over past experience. It is anticipated the added cost will be in the range of \$50,000 to \$100,000 per mile.

MaineDOT Plant Mixed Recycled Asphalt Pavement (PMRAP) Program

rev. Feb. 19, 2016

RJCrawford

PMRAP subcommittee members:

Rich Crawford, PE, Assistant Director, Bureau of Project Development (BPD)
Scott Bickford, PE, Assistant Highway Program Manager, BPD
Brian Luce, Pavement Quality Manager, BPD
Kyle Hall, PE, Southern Region Engineer, Bureau of Maintenance & Operations (M&O)
Jamie Andrews, PE, Mid-coast Region Engineer, M&O
Mark Hume, PE, Western Region Engineer, M&O
John Devin, PE, Eastern Region Engineer, M&O
Brent Bubar, PE, Northern Region Manager, M&O

Project Selection: With the provided expectations, project selection to assure effective treatment is critical. When reviewing a segment of roadway for candidate selection, the team should identify poles, trees, potential guardrail installation areas, inslopes and backslopes, and other areas of safety concern for acquisition of rights needed. This will play a role in project selection. This will also assist in budget determination and scheduling of the project. Another consideration is the location of RAP piles. The Department has piles of RAP material in various locations across the state. The haul distance to the project location from the material location is a determining factor in the cost-effectiveness of this treatment. Strategic placement of RAP material will be critical to assure we have material available for future PMRAP candidate projects. If a roadway segment is determined an inappropriate candidate for the PMRAP Program, it shall remain in the LCP program until such time that adequate funding is available to perform the appropriate level of rehabilitation.

Roadway Template: The project shall be designed to match the existing corridor. Generally, the existing travelway and shoulder width shall be maintained. A minimum of 11' shall be paved, regardless of travelway width, with the remaining shoulder width being gravel. Engineering judgment shall be used in the determination of final edge line placement.

Consideration shall be given to paving the inside of curves. Factors for consideration are degree of curvature, truck volumes, maintenance issue, accident history, etc. The Highway Program, with Region input, shall determine areas for full width paved shoulders within the project limits.

Alignment: There is no expectation of improvement to horizontal or vertical alignment. The new profile grade should parallel the existing profile grade. If there is an identified safety need for spot vertical/horizontal alignment improvement, that work should be funded and performed under a different infrastructure improvement program.

MaineDOT Plant Mixed Recycled Asphalt Pavement (PMRAP) Program

rev. Feb. 19, 2016

RJCrawford

Safety: There is an expectation to make improvements to the safety of these roadways. Accident data shall be analyzed to identify problem areas related to lane departure accidents, animal/vehicle collisions, and other safety concerns. This will bring engineering focus to trouble areas.

- Cross slope: Excessive cross slope of the roadway is a contributing factor to lane departure accidents. Cross slope will be maintained as outlined below. Full automation shall be used when placing PMRAP.
 - Normal Section: The allowable cross slope range shall be -1 1/2% to -4%. Standard cross slope shall be -3%. Approval from the Engineering Council will be required for cross slopes exceeding -4%. Efforts should be made to provide consistent cross slopes over reasonable lengths of the project to provide the driver with a comfortable experience, rather than continuously change cross slope within the allowable range.
 - Superelevated section: Every effort shall be made to bring the superelevation of a curve to +3%, if existing is > +3%, maintain existing +%. Impacts outside of the roadway will be considered. The minimum cross slope on the high side of the curve shall be no less than +1%. The minimum cross slope for the low side shall meet the abutting normal cross slope.
 - Rumble strips shall be considered to address areas of concern. All installation shall conform to MaineDOT's Rumble Strip policy.

- Horizontal Offset: Obstacles near the roadway can be contributing factor to personal injury and property damage from lane departure accidents. The decision to remove obstacles is one of prudent risk. However, this often leads to the need for obtaining various property rights to remove hazards. Balance of the impacts to abutters, the hazard to the public, and budget impacts are key factors to rehabilitating these corridors. Meeting driver expectations are an important factor as well.
 - Utility poles: Any poles within 16' of centerline shall be moved back to the same offset as the other poles within that segment of the corridor. Poles closer to the roadway than the others within that segment of the corridor shall be reviewed using engineering judgment to determine if any moves are needed. It is expected to move poles in spot locations only, not the entire length of project.
 - Trees: Any trees within 16' of centerline shall be removed. Trees between the 16' mark and the average vegetation buffer for the considered segment of roadway shall be reviewed using engineering judgment to determine removal.
 - Ledge outcrops, boulders, etc.: Any ledge outcrops/boulders within 16' of centerline shall be removed. Other ledge outcrops/boulders close to the roadway shall be reviewed using engineering judgment to determine removal.

MaineDOT Plant Mixed Recycled Asphalt Pavement (PMRAP) Program

rev. Feb. 19, 2016

RJCrawford

- **Guardrail Use:** All existing guardrail will comply with the Engineering Instruction for Guardrail and Guardrail Terminal Policy, Rehabilitation. New guardrail shall be used in spot locations along a project to protect vehicles from a hazard. Engineering judgment shall be used to determine if the installation of guardrail is introducing a greater hazard. Prior to guardrail installation the following items shall be considered.
 - Body of water at base of slope
 - Vertical drop of 15' or more from top of slope to bottom of slope
 - Alignment of roadway next to hazard (outside of curve, inside of curve, tangent section)
 - Accident history at that location
 - Length of hazard

- **Sign upgrade:** Signing improvements can assist in improving safety along a roadway. The Region Traffic Engineer shall review the project and make recommendations to the signage. Advisory signage can be a low-cost solution to alert drivers of a potential hazard.

Drainage: Installation of drainage ditches and replacement of deteriorated pipes are an expectation with PMRAP projects. To assure longevity to the roadway improvement, proper drainage improvements need to be made along the entire project. Ditch depths can be varied with consideration of the drainage efficiency of the underlying soils. Acquisition of rights to accommodate drainage installation may be necessary. Early identification of rights needed and environmental permitting requirements for proper drainage will assist in realistic and achievable schedules.

Right of Way: The expectation is to acquire rights, if needed, for limited portions of the project. It is not expected to clear up all R/W concerns or to maintain a consistent R/W width within a segment of the corridor. Items justifying obtaining rights are listing below, but are not limited to

- Movement of utility poles for clear zone improvements
- Tree/DFO removal
- Installation of drainage ditch in a segment of the corridor.
- Inslope and backslope accommodations
- Other needs shall be determined by the Highway Program

Environmental: It should be noted that an existing gravel shoulder can be paved without invoking stormwater permitting. However, it may have an impact on historical properties and should be given appropriate consideration.

MaineDOT Plant Mixed Recycled Asphalt Pavement (PMRAP) Program

rev. Feb. 19, 2016

RJCrawford

Design Exceptions for PMRAP Projects: When controlling criteria cannot meet the guidance in this document, the design exception process will be as follows. A Design Exception request will be completed. This will be forwarded on to the Highway Program Manager for concurrence of request. Upon concurrence, the Highway Program Manager will forward the request on to the PMRAP subcommittee members noted in this document, as well as the Chief Engineer. This group will grant, deny, or offer alternatives for the requested DE.

Summary of Engineering Decisions: A summary of Engineering Decision shall be placed in the Project file regarding the Engineering Judgment used for any PMRAP project. This document will discuss rationale for decisions made along the development process. It will reflect the particular items discussed in this guidance. It will also serve as the documentation for Design Exceptions.