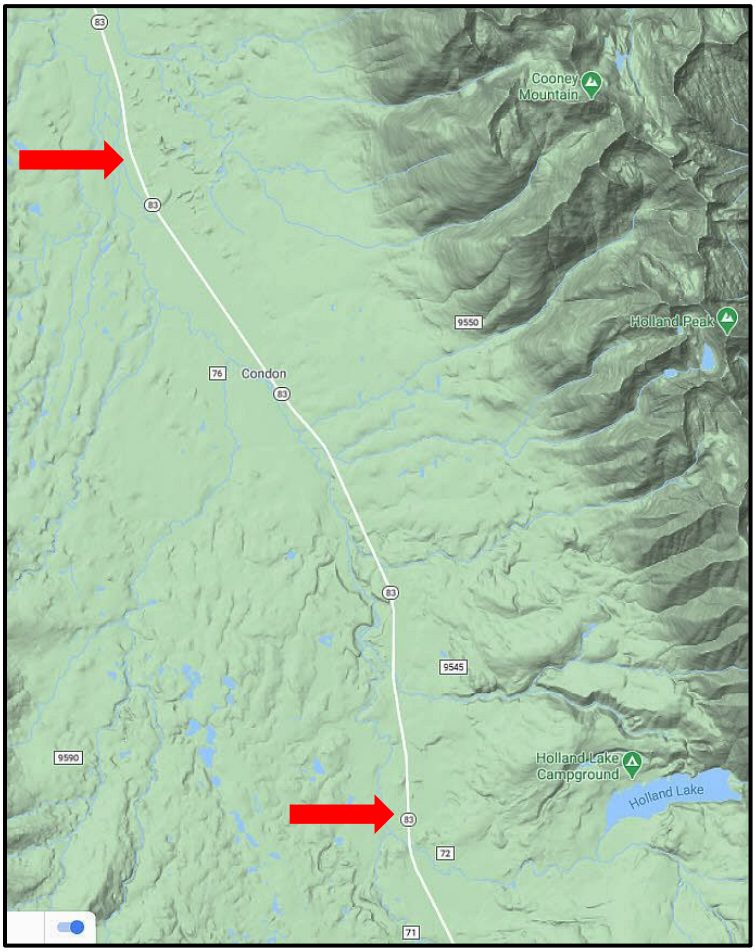
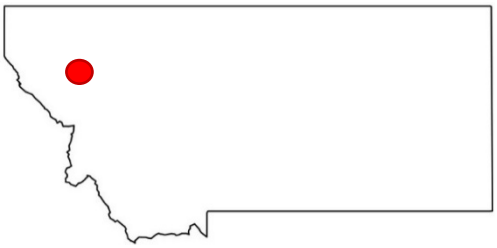
Experimental Feature Evaluation
December 2022

Experimental Feature:	Longitudinal Joint Void Reducing Asphalt Membrane (VRAM)
Location:	Missoula District, Missoula County, MT Hwy 83, Reference Post 31.5-45.8
MDT Project Name:	Condon – North & South
MDT Project Number:	STPP 83-1(40)32[9500]
Experimental Project Number:	MT-20-06
Principle Investigator:	Chad DeAustin, ExPM
Technical Contact:	Mike Dodge, Materials Reviewer
Construction Date:	July/August 2020
Date of Inspections:	September 2021, June 2022

Project Map





*Location approximate, not to scale.

Feature Description & Outline

The objective of this feature is to determine the effectiveness of adding a void reducing asphalt membrane (VRAM) to mitigate longitudinal joint deterioration on a two-lane primary highway. Longitudinal joints tend to be vulnerable to water intrusion resulting in accelerated roadway degradation in areas with harsh freeze/thaw cycles.

JBAND was the selected VRAM product which is produced by Asphalt Materials. It is applied by spray truck as a heavy fluid membrane under the intended longitudinal joint. Per manufacturers information, once cured the JBAND remains a non-tracking stripe; as plant mix is applied over the membrane and compacted it migrates into the overlay to reduce joint permeability. It has been reported on average that 50-70% of the VRAM may migrate into the AC.

JBAND was applied in two passes at approximately 9" in width. One lane was milled and cleaned, then a pass of JBAND was applied at the milled centerline joint. After adequate cure time, the lane had tack applied then paved. The other lane was milled, subsequently cleaned and the VRAM was applied at that milled joint followed by tack application and paving.

Evaluation Procedures & Schedule

The measure of effectiveness (MOE) prevalent with this feature are:

- Construction practice (constructability, construction time, cost effectiveness, etc.),
- Longitudinal joint durability.

In accordance with MDT's Experimental Features Procedures, the Experimental Project Manager will monitor and report on performance for a minimum of five years annually. This includes delivery of a work plan, construction report, annual reports, and final project report.

2020:	Installation/Construction Report
2021-2025:	Annual Inspections/Evaluation Reports
2025:	Final Evaluation/Final Report

A dedicated webpage provides all reporting for the experimental feature.

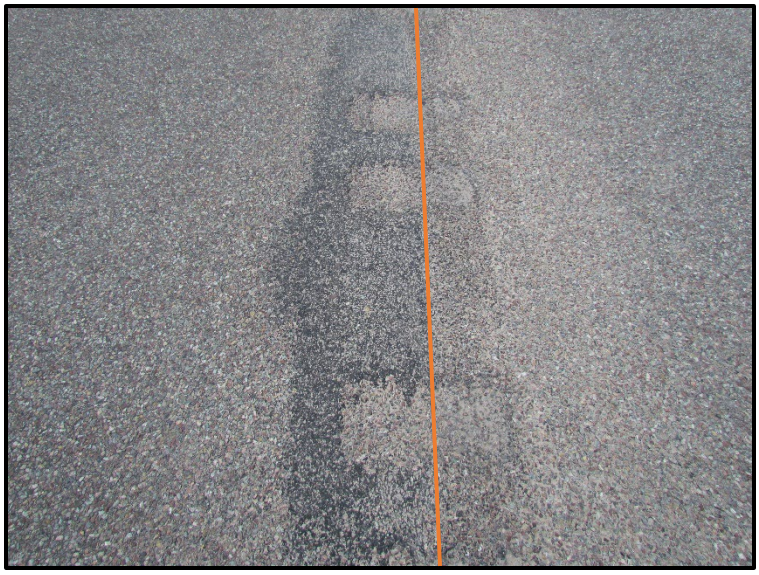
2022 Update – May

During the site visit in 2022, bleeding of the JBAND was noted throughout the project, which was also noticed in 2021. In the photos on the next few pages, the bleeding can be seen as a darker color along the rumble strips. Upon discussion with others at MDT, the thought is that this is the product working bottom up to fill the voids in the longitudinal paving joint. Also noted that the bleeding is not causing chip loss but is instead flooding the chips. Both situations will be monitored in the coming visits.

⬆ RP 31.5, view north. Conditions at the south end of the project.

⬆ RP 31.5, close-up view. VRAM bleeding evident but contained at centerline.

⬅ RP 38.3, view north. Area where the VRAM bleed through is a little more noticeable.

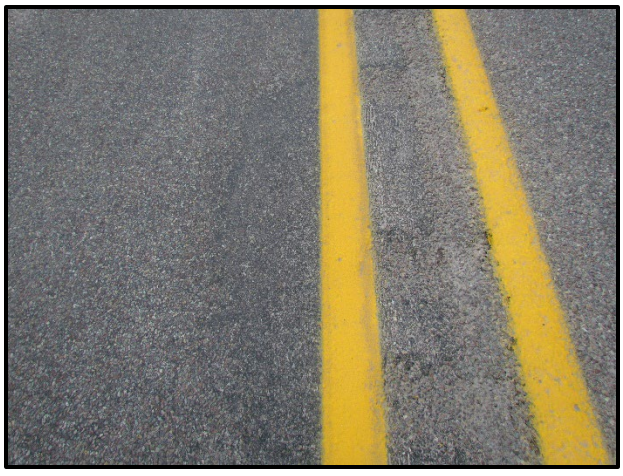


⬅ RP 38.3, close-up. The orange line highlights, most likely, the centerline joint seam.

⬅ RP 38.3, close-up. Closer view of the seam from the photo above.

Most of the VRAM bleed through was within the width of the double solid yellow centerlines through the project. The photos below highlight some of the wider areas of bleed through to watched closely as it is beginning to encroach on wheel paths.






Construction Documentation – July/August 2020

⬅⬇ Several images of the first milling pass on the southbound lane. Prior to the VRAM application the milled area was broom swept then a hand-held blower was used at the centerline.

🡸🡻 The project used a self-contained distributer unit for the JBAND application.

The distributer is equipped with a heating and recirculating system along with computerized pressure unit to insure the desired application rate.

A conveyor belt transfers the wrapped blocks of JBAND to the receiving hopper (yellow arrow).

🡸🡻 Several examples of the VRAM distribution in progress.

A worker follows behind to ensure the driver maintains correct alignment to the centerline joint.

The worker also carries a large spatula (or floor scraper) to assist in the proper spread of product.

🡸 Completed southbound VRAM pass under cure.

Based on the application rate and ambient condition, adequate cure may take between 15-30 minutes.

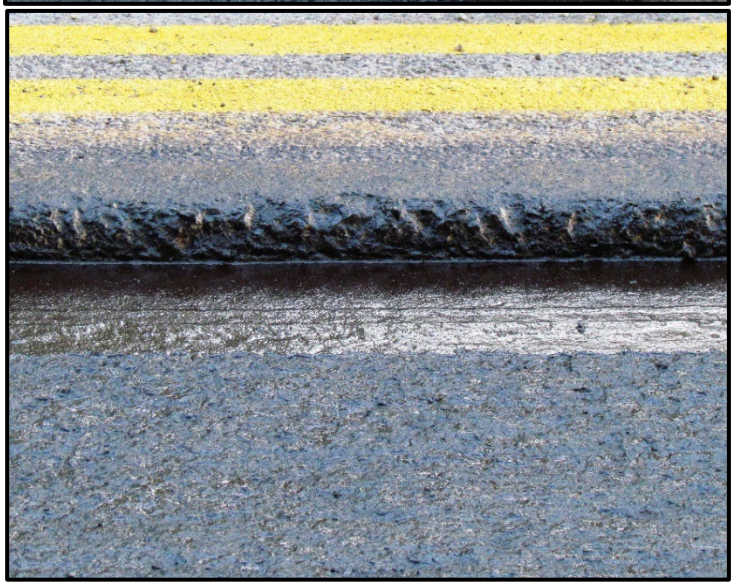
🡸 Areas of VRAM placement considered under applied, or vehicle movement may have separated the product from the pavement, were field marked and reapplied by hand.

Close-up of VRAM with an approximate cure of 15 minutes (southbound lane).

⬆ Initially the tack coat was applied over the VRAM, it was reported there were instances where vehicles driving over the VRAM pulled or tore the strip. It was felt the tack may be causing the VRAM to become too sticky and this process was changed to tacking just prior paving.

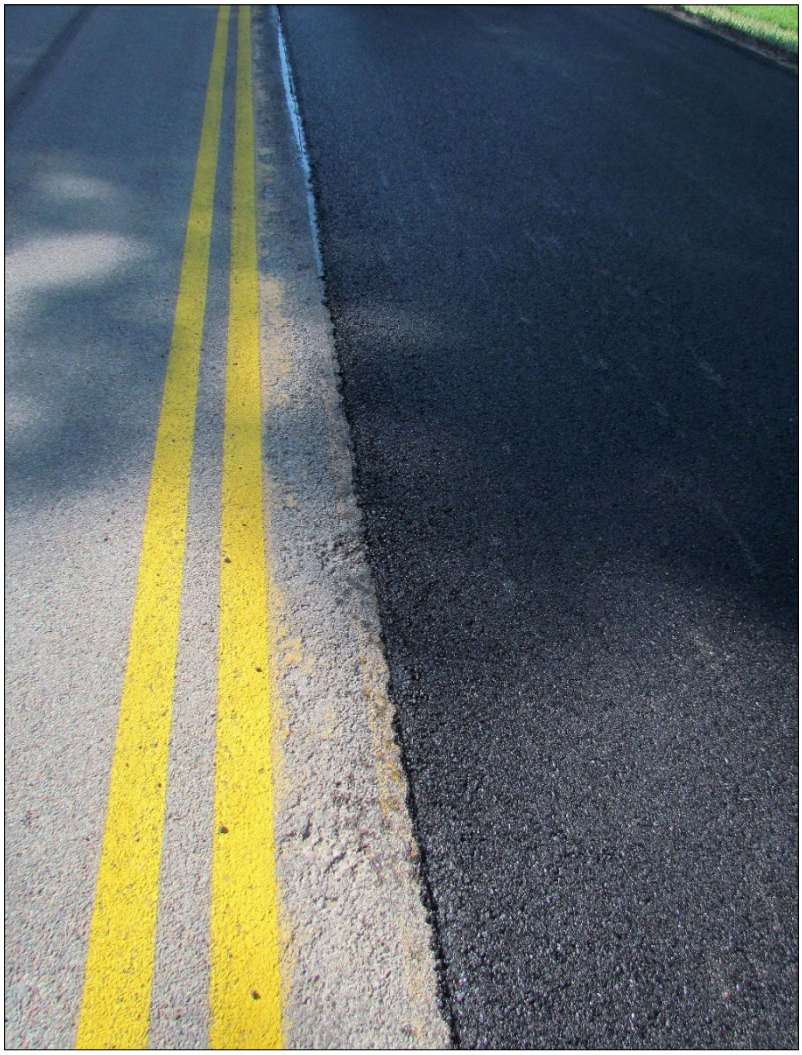
🡸 Start of southbound tack coat.

🡸 Completed tack run.



🡸 Close-up of tack at centerline joint.

← Start of the southbound paving phase.



← Example of compacted AC at longitudinal centerline.

🡸 Northbound lane milled and prepped for VRAM application.

🡸 This image shows the mill pass that has cut into the southbound lane JBAND strip. The pen marks the edge of the JBAND strip.

🡸 Northbound lane with VRAM strip applied.

Northbound lane paving completed.

Project with temporary striping and centerline rumble strip. Chip seal was completed in August 2020.

⬆ Several core samples taken from the projects centerline which shows the extent of the VRAM migration into the AC matrix. The core on the far left is split. Image courtesy of CES Review Section.

Preconstruction Documentation – June 2020

🡸🡻 Several examples of centerline joint condition prior to start of project. Top image is near RP 32, lower is near RP 43.

Disclaimer Statement

This document is disseminated under the sponsorship of the Montana Department of Transportation (MDT) and the United States Department of Transportation (USDOT) in the interest of information exchange. The State of Montana and the United States assume no liability for the use or misuse of its contents.

The contents of this document reflect the views of the authors, who are solely responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or official policies of MDT or the USDOT.

The State of Montana and the United States do not endorse products of manufacturers.

This document does not constitute a standard, specification, policy, or regulation.

Alternative Format Statement

MDT attempts to provide accommodations for any known disability that may interfere with a person participating in any service, program, or activity of the Department. Alternative accessible formats of this information will be provided upon request. For further information, call 406/444.7693, TTY 800/335.7592, or Montana Relay at 711.

This public document was published in electronic format at no cost for printing and distribution.