

# EMC SQUARED® System Full-Depth Reclamation of High Altitude Mountain Roads

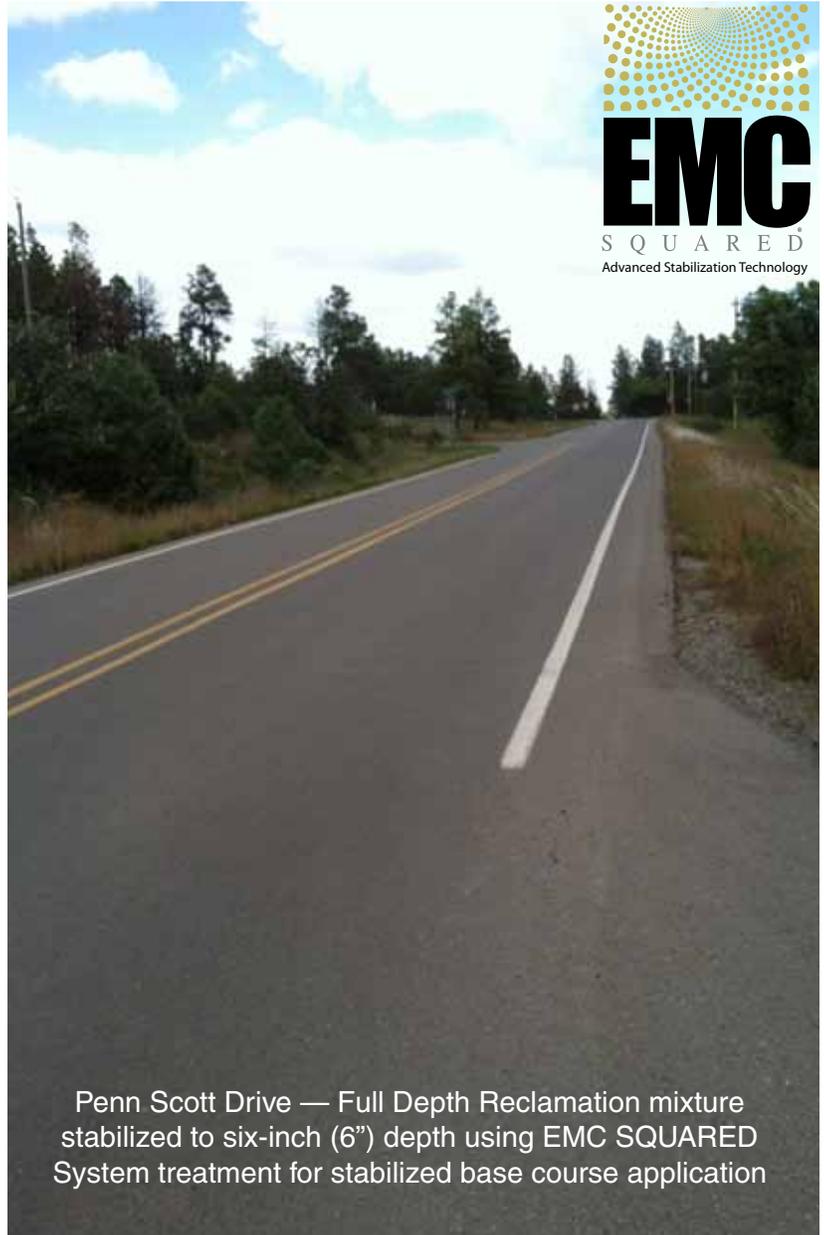
Beginning in the Fall of 2010, a series of three road reconstruction projects were completed on the Mescalero Apache Reservation in New Mexico. The Mescalero reservation is situated in the heavily forested Sacramento Mountains midway between the cities of Tularosa and Ruidoso, New Mexico. Funding for all three projects was provided by the Bureau of Indian Affairs (BIA). With project elevations ranging from about 6,500 feet to 7,500 feet these locations are all subject to winter snow, frozen ground conditions, and frequent freeze-thaw cycles. All three projects were specified by the Project Engineers for Full Depth Reclamation (FDR) with the EMC SQUARED Stabilizer product. In an FDR road reconstruction process, the existing asphalt pavement section and a predetermined amount of underlying aggregate base course materials are pulverized into a homogeneous mixture and treated with a stabilizer product to produce a stabilized base course prepared for placement of a new Hot Mix Asphalt pavement or a chip seal surface treatment.

## The Projects

**MESCALERO BOULEVARD:** The road passes by the tribe's administration building and then up a hill into a residential area. At its northern terminus, the reconstruction project links to State Highway 70. While the construction specifications called for application of the EMC SQUARED stabilization treatment to the recycled pavement mixture, the FDR approach

was not used on the Mescalero Boulevard project. Instead, on recommendation of the contractor, the distressed asphalt was milled to restore smoothness and damaged sections of pavement were removed and patched with hot mix asphalt. The road was then resurfaced with a 2.5" thick hot mix asphalt overlay. According to the Project Engineer for the BIA, the original FDR design for this project called for application of the stabilization treatment to a 10" depth of the mixture of recycled pavement and aggregate base materials. This deviation from the original FDR project design allows observers to make a performance comparison between this project and the two that used the EMC SQUARED System FDR construction method.

**PENN SCOTT DRIVE AND PALMER LOOP DRIVE:** At an average elevation of 7,450 feet, the Penn Scott Drive FDR road project is situated at the highest elevation of the three projects. The Palmer Loop Drive FDR project is at an average project elevation of 7,300 feet. These two projects are located off State Highway 70, some 10 miles north east of the Mescalero Boulevard project. They utilized EMC SQUARED Stabilizer to treat a 6" depth of recycled



Penn Scott Drive — Full Depth Reclamation mixture stabilized to six-inch (6") depth using EMC SQUARED System treatment for stabilized base course application

asphalt millings and aggregate base materials. The recycled base and asphalt materials were pulverized and then stabilized with the EMC SQUARED® System treatment. A disc plow equipped with depth control gage wheels was used for mixing operations. After the stabilizer treatment was applied, the materials were shaped to grade and compacted. Both projects were completed with placement of two-inch (2") hot mix asphalt pavement on top of the stabilized base layer.



Palmer Loop Drive — Full Depth Reclamation stabilized to six-inch (6") depth using EMC SQUARED System treatment for stabilized base course application

The Mescalero Boulevard project used a top down approach, focusing only on repairing the existing asphalt pavement and overlaying with more asphalt pavement while ignoring the problems in the base course underneath. The FDR projects were designed and constructed from the bottom up, with new stabilized base course layers deriving their high strength and moisture resistance from the application of the EMC SQUARED stabilizer treatment. Most premature failures of asphalt pavements are caused by failure of the base course materials underneath the pavement. Given that fact, it could be anticipated that the first project, Mescalero Boulevard, would perform poorly, which turned out to be the case. In contrast, field reports on the asphalt pavements placed on top of the EMC SQUARED Stabilized Base courses indicate that they remain in excellent condition after almost ten years in service. Two types of road reconstruction projects are on exhibit here. The Mescalero Boulevard project is based on a top down approach that upgrades the upper asphalt layer with no investment made to improve the base layer, while the other two projects were built from the bottom up, with improvement of the foundational layers under the new pavement as the first priority. The Project Engineers who developed the original FDR design for these high altitude mountain road projects have continued to monitor these EMC SQUARED Full-Depth Reclamation projects and have been impressed with their performance. They have designed additional road reconstruction projects with this same EMC SQUARED FDR process specified and currently await funding before construction can be scheduled.

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