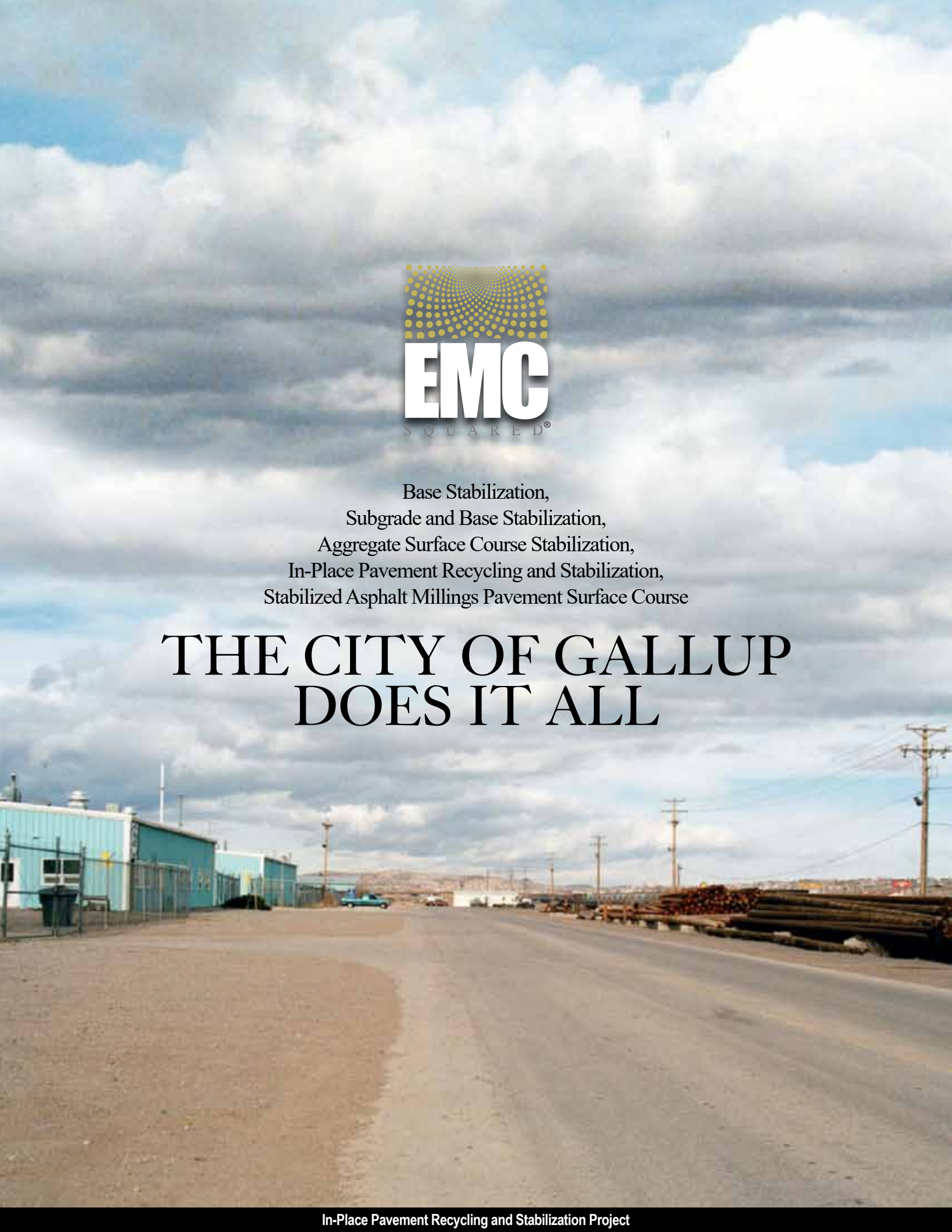


EMC SQUARED®

Base Stabilization,
Subgrade and Base Stabilization,
Aggregate Surface Course Stabilization,
In-Place Pavement Recycling and Stabilization,
Stabilized Asphalt Millings Pavement Surface Course

THE CITY OF GALLUP DOES IT ALL

In-Place Pavement Recycling and Stabilization Project

The City of Gallup, New Mexico, has an impressive history of innovation in their engineering and street maintenance departments. Gallup is located at relatively high altitude just west of the Continental Divide in the southern end of the Rocky Mountains. The area has severe winter conditions and frequent freeze-thaw cycling, compounded by low bearing strength clay subgrade soils that are often in highly saturated condition. To compound the problem, the local aggregate supplies have clay content and are typically moisture and frost susceptible. If necessity is the mother of invention, city staff has good reason to be innovative.After reviewing technical information on the EMC SQUARED® System and contacting other public agency personnel with previous field experience, the City's first project was full depth in-place recycling of the distressed asphalt access road to their corporate yard facility. The existing asphalt pavement and aggregate base materials were pulverized and mixed with the stabilizer solution by an asphalt reclaimer mixing machine. After proving out the 9-inch thick stabilized layer under their daily truck traffic, they surfaced the stabilized base with new asphalt pavement (*pictured on the front cover*). Twenty-four years later this pavement is smooth running and free of distress.

The City took over an area from the county known as the South Annex the same year and the street maintenance crew inherited almost five miles of potholed roads that were so deteriorated that winter access had become problematic even for four-wheel drive vehicles. The City first reviewed the stabilization program using cement, but their previous experience indicated that it would be five times the cost of the EMC SQUARED® System treatment, slower to construct, and in need of immediate protection with an asphalt pavement surface course. EMC SQUARED System treatment was the clear choice given their limited budget. Using the asphalt reclaimer equipment once again, the city street maintenance crew mixed in the EMC SQUARED System treatment as they placed six inches of new gravel surfacing over the five miles of streets. The stabilized streets, as pictured at right, serviced industrial and commercial businesses, public schools and residential neighborhoods. The street superintendent reported that the stabilized aggregate streets required almost no maintenance and mentioned that the only complaint came from contractors cutting utility trenches through the stabilized base as they were unable to cut through the stabilized layer with tractor mounted backhoe equipment. Similar to their experience with cement treated base materials, cutting the utility trenches required the use of jackhammer equipment to penetrate the stabilized and highly bound layer.

The aggregate material from the street surfacing project was sampled and shipped to the Texas Transportation Institute

Asphalt Millings (RAP) Stabilized with EMC SQUARED® Stabilizer
(utilized for five years as a street surface)

Aggregate Stabilized with EMC SQUARED® Stabilizer
(utilized for two years as a street surface)

(TTI) where it was evaluated in Suction and Dielectric testing. The test results indicated that the untreated aggregate would be highly unstable in the presence of moisture or during freeze-thaw cycles. This correlated with the City's historical experience. Results for the same aggregate material treated with the EMC SQUARED® System indicated that the stabilized aggregate would retain its full strength, regardless of weather conditions, as specimens tested similarly to asphalt and concrete pavement. This test result was again verified in actual field performance.

Two years after the stabilized aggregate surfacing was placed on the streets of the South Annex, the City was given access by the New Mexico Department of Transportation (NMDOT) to a large stockpile of recycled asphalt material milled off the surface of a nearby state highway. The street maintenance crew once again used their asphalt reclaimer machine to mix in the EMC SQUARED System treatment as they constructed a three inch thick pavement with the stabilized asphalt millings materials (*pictured on previous page upper left*). After five years of maintenance-free performance the City allocated the budget to overlay the stabilized asphalt millings surface with hot mix asphalt pavement. The City's Street Superintendent reported that they filled in no more than a dozen half-grapefruit sized potholes in the entire five mile stabilized asphalt millings surface in preparation for placement of the hot mix asphalt overlay. Several days prior to placement of the asphalt overlay local geotechnical engineering firm AMEC Earth & Environmental Inc. cored the stabilized asphalt millings pavement in a number of locations as well as coring through the stabilized asphalt millings layer and the stabilized base course layer at one location. As the core sample of the stabilized millings and stabilized aggregate pictured on the previous page clearly illustrates, the EMC SQUARED System treatment was effective in producing well bound layers that were water resistant and wear resistant under vehicular and truck traffic. Link: Stabilized Asphalt Millings Meet Asphalt Pavement Standards

While the City of Gallup has included EMC SQUARED System treatments in ongoing projects for stabilization of aggregate surfaced roads and other aggregate base course layers, a parking lot reconstruction project at the Gallup City Airport provided unique stabilization challenges which deserve special mention. Similar to nearby NMDOT projects on Interstate 40, the subgrade under the parking lot was essentially a muddy bog. Saturated clays extend down far below the parking lot base course grade. Conventional lime stabilization was not feasible as any wind-blown lime would damage aircraft parked down wind. The contractor instead utilized an EMC SQUARED System application to bridge the deeper soft subgrade, applying increasing compactive effort as the stabilizer treatment gradually stiffened the layer. The stabilizer treatment was then applied to the eight inch thick base course layer prior to placement of the asphalt pavement. This section of parking lot remains in good condition in spite of the problematic subgrade conditions below.

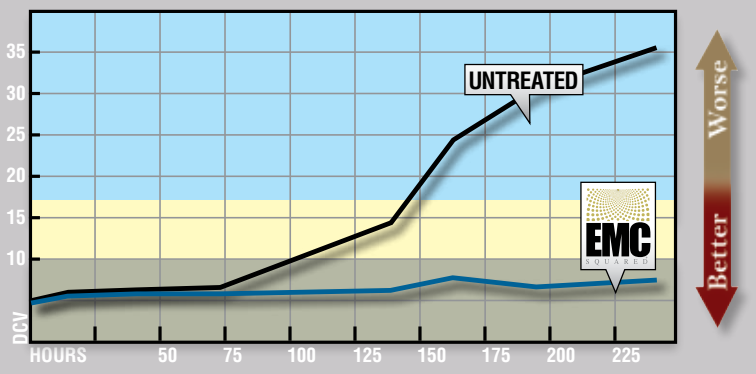
All these stabilization applications were accomplished for just pennies per square foot. It is an exceptional case study of a city "Doing More with Less," the definition of sustainability.

Suction and Dielectric Testing (Tube Suction Testing)[1]

A Dielectric Value of greater than 15
indicates that the aggregate is wet or water saturated and extremely moisture and frost susceptible

A Dielectric Value of 10 to 15
indicates that a significant amount of free water has accumulated within the aggregate during the testing period and is a warning signal that the material is moisture sensitive and frost susceptible

Aggregate materials with a Dielectric Value of less than 10
are considered non-moisture sensitive and non-frost susceptible in service for road and highway base applications



References for Dielectric Constant Values of Highway Materials

MATERIAL	DIELECTRIC VALUE
Dry Aggregates	4 - 6
Asphaltic Concrete	5 - 7
Portland Cement Concrete	7 - 9

1) Syed and T. Scullion, Texas Transportation Institute, Texas A&M University, College Station, TX 77843-3135. R.B. Randolph, Soil Stabilization Products Company, Inc., Merced, CA 95344
"Tube Section Test for Evlauating Aggregate Base Materials in Frost and Moisture Susceptible Environments" Transportation Research Record 1709, January 2000, 78-90

Aggregate Surface Course Stabilization Project

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(800) 523-9992 or (209) 383-3296

Canadian Sales: Milieu Road Technologies, Ltd. (780) 875-9159

EMC SQUARED System products are used in combination with natural earth materials such as aggregates and soils and mixtures of reclaimed asphalt and concrete pavements. The products are components in the construction of a final product. Engineering and construction controls are vital to the selection of all the ingredients and construction processes which will deliver the final product, and the excellence of that end result is, in large measure, dependent upon engineering judgements and construction quality control measures.

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