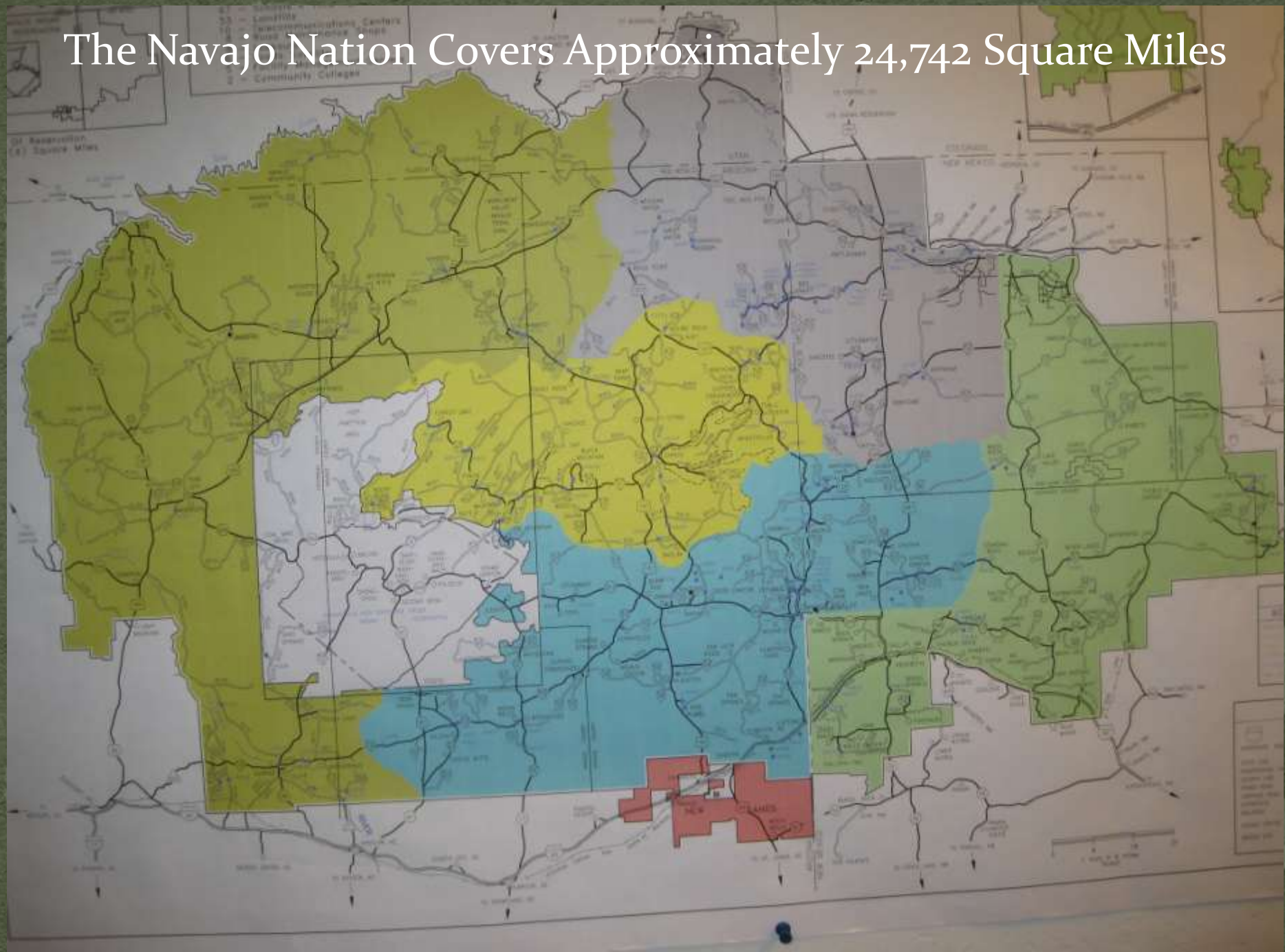


Navajo Nation/BIA

2010/2011

**Asphalt-Rubber
Chip Seal Project**

The Navajo Nation Covers Approximately 24,742 Square Miles



Project locations through-out the Navajo Nation

- Eastern Agency
- Western Agency
- Fort Defiance/New Lands Agency
- Shiprock Agency
- NECA N-13
- NIIP Roads
- Chinle Agency



Asphalt-Rubber Chip Seal - Project Facts:

- Total Mileage – Approximately 368 Centerline Miles
- Square Yardage – Approximately 7.5 Million Square Yards
- Asphalt-Rubber Binder – Approximately 18,400 Tons
Standard AR Binder 81.5% PG 64-22/18.5% 14 Mesh CRM
- Tires Recycled – Approximately 550,000 Tires
- Aggregate – Approximately 127,000 Tons (4 Suppliers)
Standard 3/8 Aggregate (BIA Stringent Requirements)
- Fog Seal Emulsion – Approximately 3,200 Tons
- Man Hours – Approximately 35,000 Hours

Asphalt-Rubber Binder Requirements

Rotational Viscosity, 177⁰ C (350⁰ F), Pascal Seconds	1.5 – 4.0
Penetration, 4⁰ C (39⁰ F), 200 g, 60 sec. (ASTM D5); 1/10 mm	10 Minimum
Penetration, 25⁰ C (77⁰ F), 100 g, 60 sec. (ASTM D5); 1/10 mm	25 - 75
Resilience, 25⁰ C (77⁰ F) (ASTM D3407); %	20 Minimum
Softening Point, (ASTM D36); ⁰C (⁰F)	55 (131) Minimum
Ductility, 4⁰ C (39⁰ F), (ASTM D113); 1 CPM	5 Minimum

Application Rate Specified at .55 to .70 Gallons Per Square Yard

Aggregate Gradation Requirements

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T ₂₇ & T ₁₁)
1/2 Inch	100 Percent
3/8 Inch	70 – 85 Percent
No. 4	0 – 15 Percent
No. 8	0 – 5 Percent
No. 200	0 – 1 Percent

Aggregate was specified to be Hot Pre-Coated and delivered to the Project Site at a temperature ranging from 250 – 325 Degrees F.

Application Rate Specified at 25 to 35 Pounds Per Square Yard

Aggregate Physical Requirements Included:

LA Abrasion

Sodium Sulfate Soundness Loss (Course and Fine)

Fractured Faces

Flat and Elongated Particles

Durability Index (Course and Fine)

Clay Lumps & Friable Particles

The BIA Required an on site Quality Control Laboratory. The requirement stated that the testing laboratory had to be AASHTO accredited qualified to perform sampling, testing and inspection as required in the contract. The on site Laboratory had to be included in the contractors Quality Control Plan. This requirement was unique to the BIA!



Roadside Vegetation was a
problem throughout the
Navajo Nation.



FLOODING was also an issue
throughout the Navajo Nation.

Western Agency







Western Agency residential streets!











Western Agency – Rural Roads.











Eastern Agency



LEGEND
AGENCY BOUND





Eastern Agency – All Rural Roads.











Let's Get Rained out, not scared out!



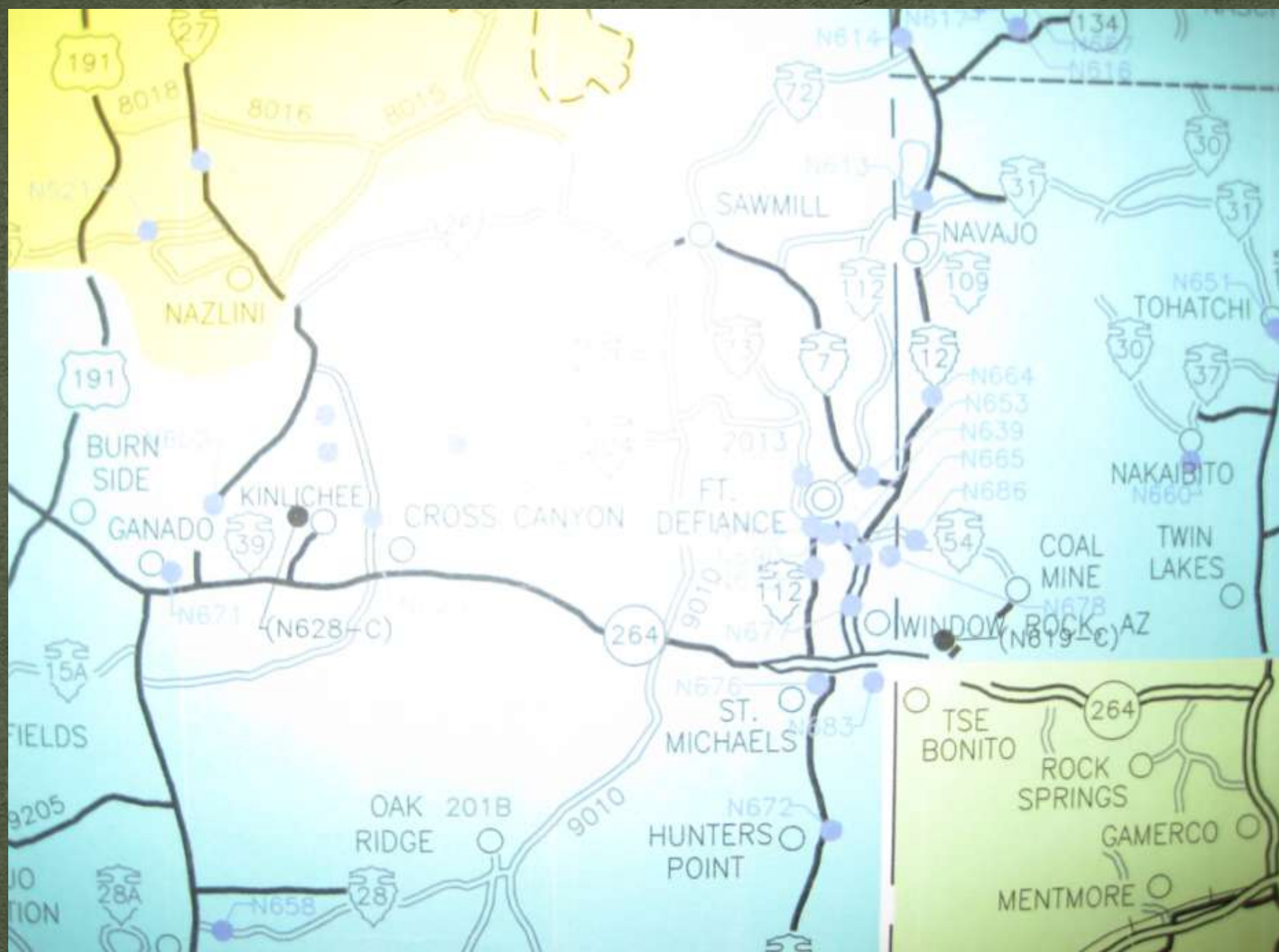
Still not scared out!



Oops, Rained Out!



Fort Defiance
New Lands
Lupton







Fort Defiance – Residential Area.











New Lands - Rural Area













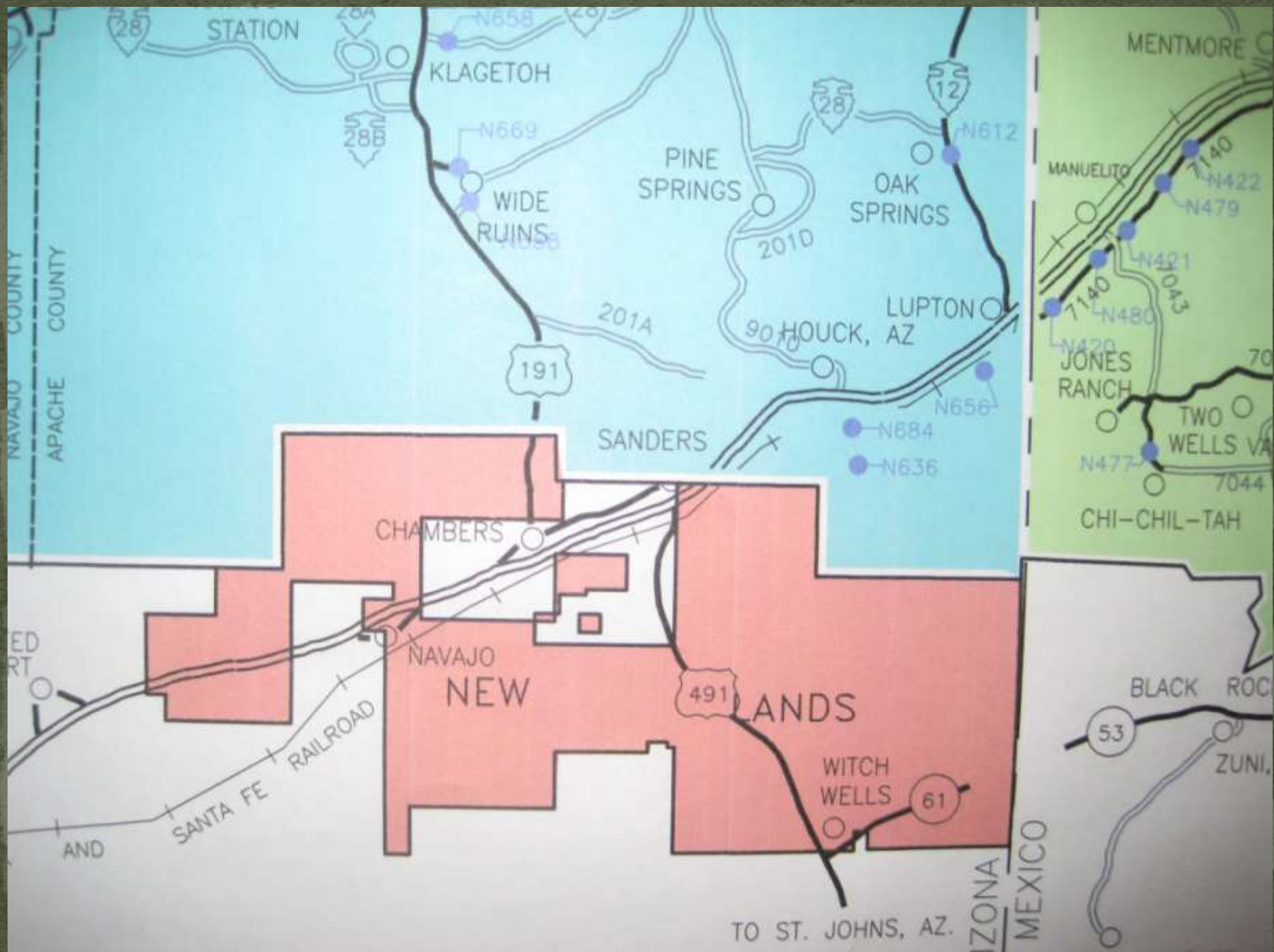


When you go down out here it
takes awhile to get going again!

Better get while the gettens' good!



Lupton – Asphalt- Rubber Double Chip Seal







Shiprock Agency





Beautiful Country on the Navajo Nation!



Beautiful Country, still some bad roads!





Too much crack sealant, not enough road!

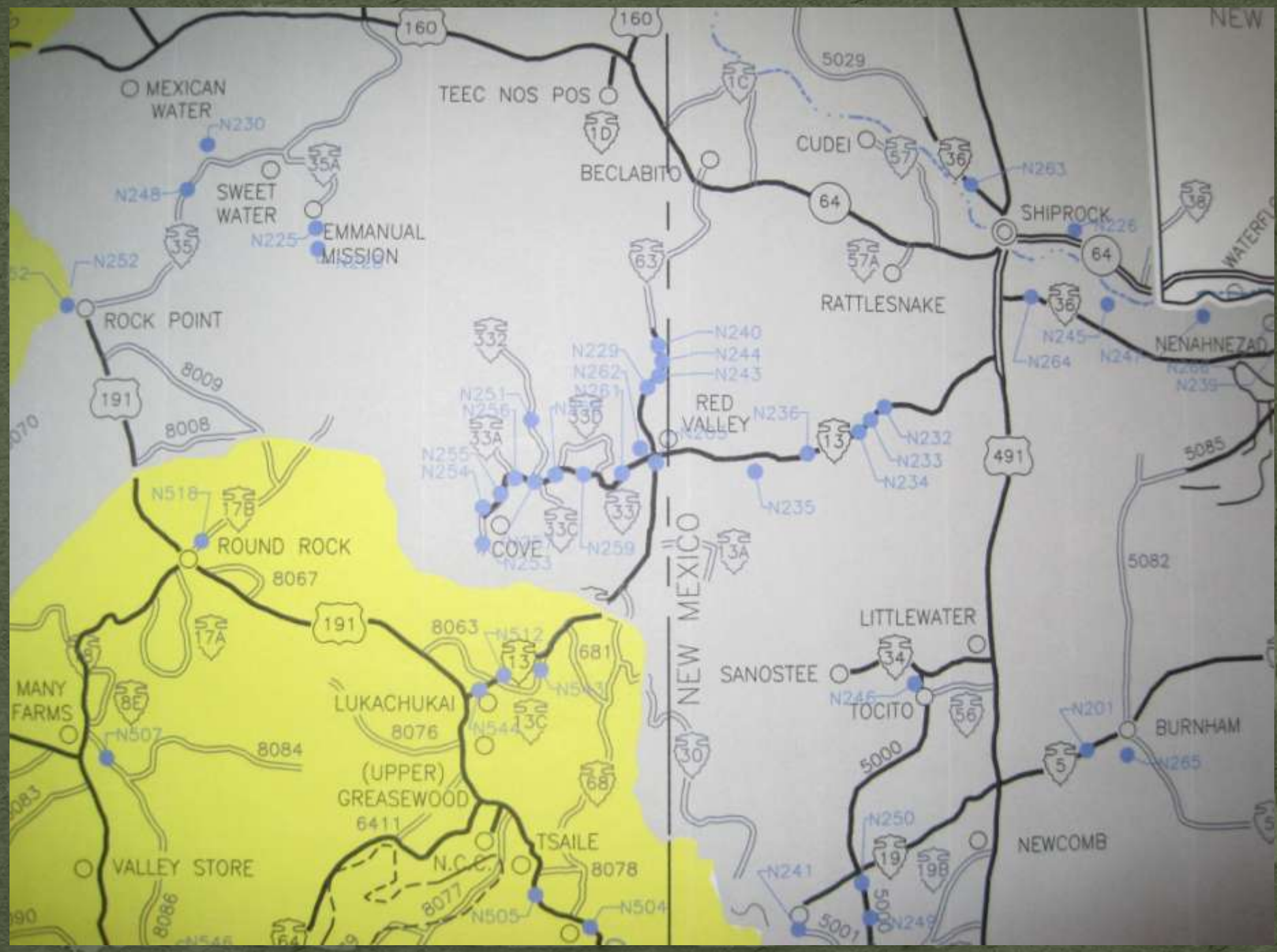








NECA – N13





N 13, One Long Highway!





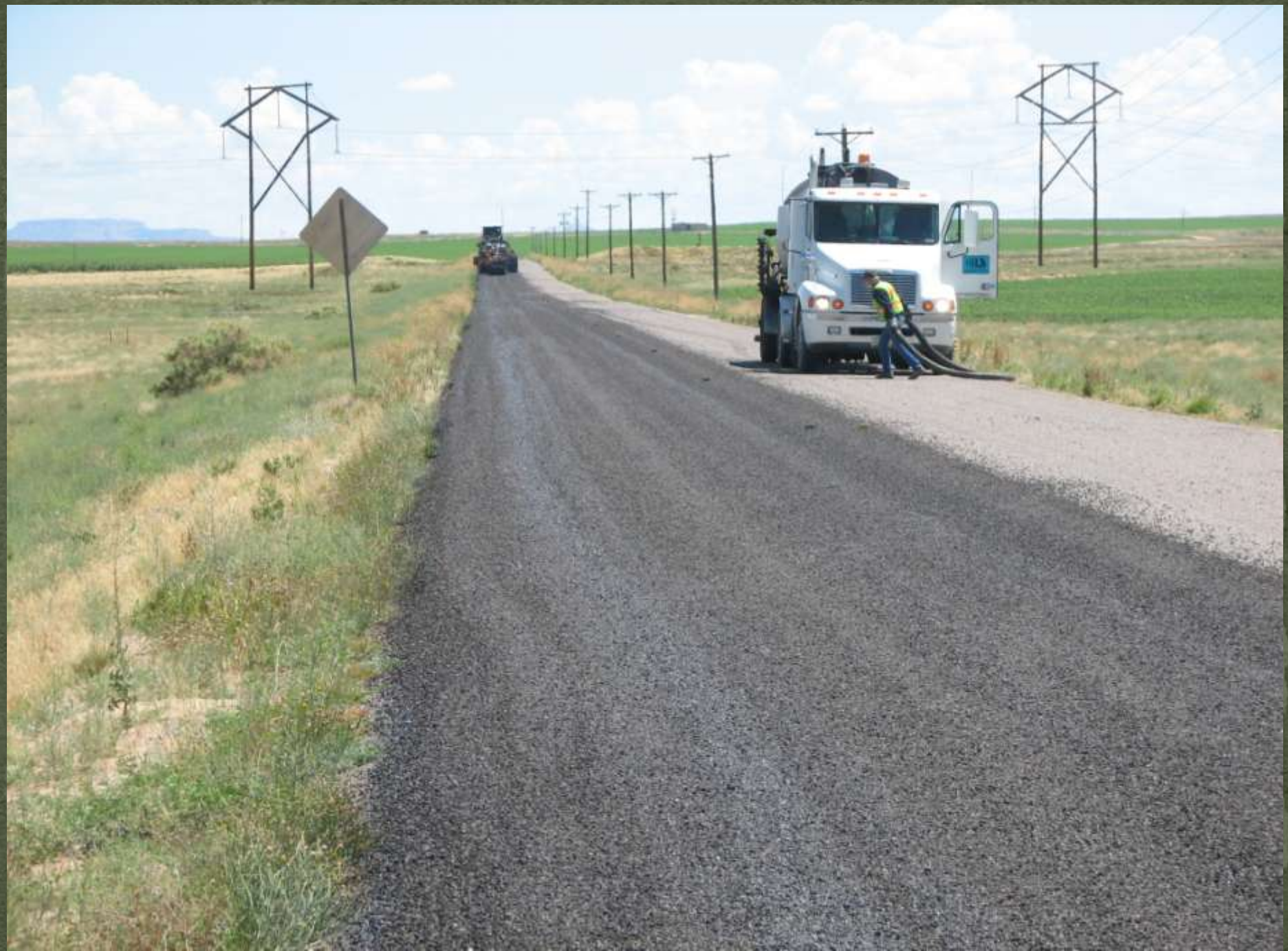
Here we go again! Another afternoon shower!



NIIP Roads







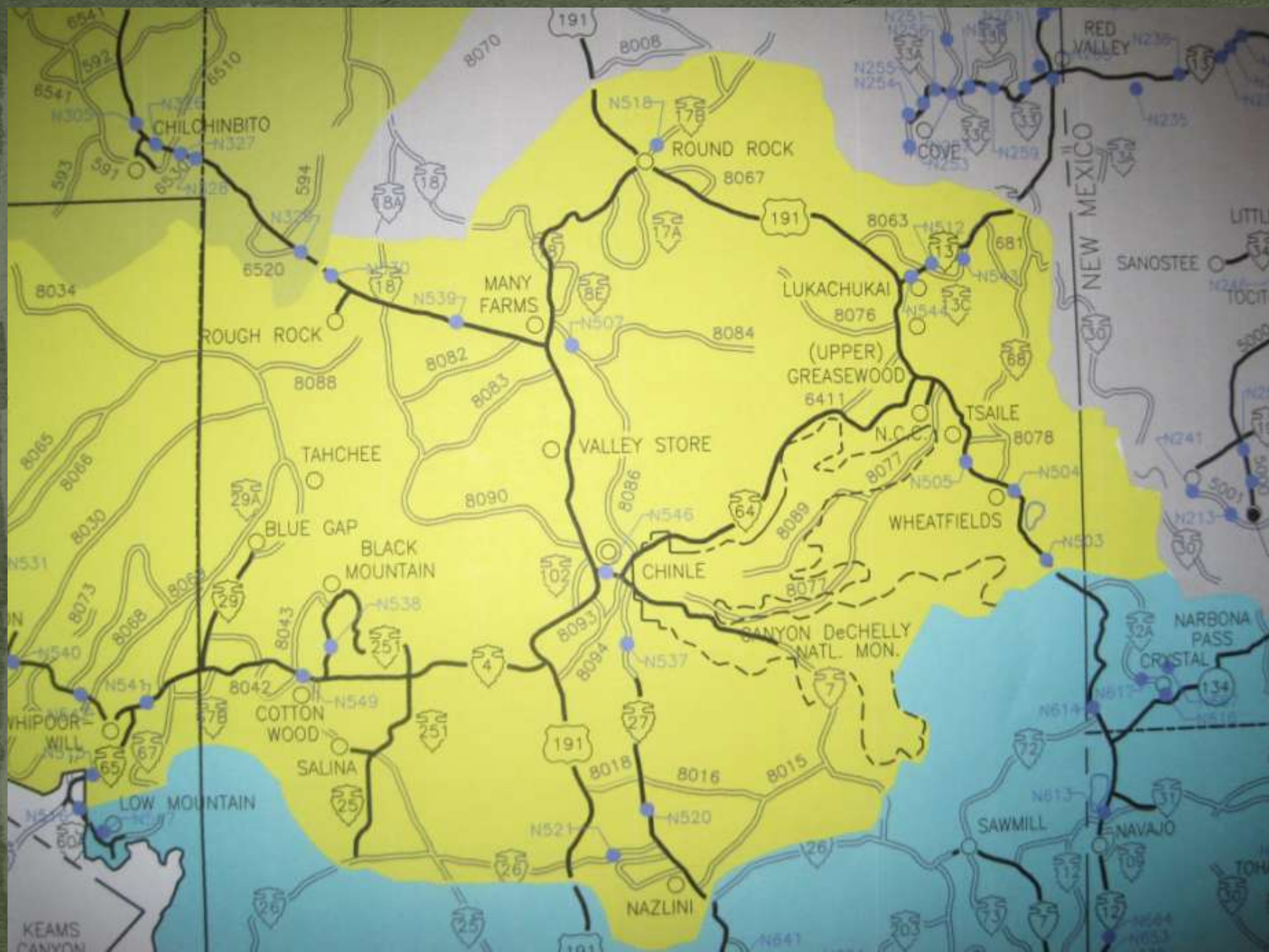








Chinle Agency
















Yes, there is traffic on the
Navajo Nation!

A photograph showing a road with a dark asphalt surface that abruptly ends at a light-colored concrete curb. Beyond the curb is a dirt and gravel shoulder. In the background, there is a grassy field and a large, flat-topped hill or mesa under a cloudy sky. A white car is visible on a road to the left in the distance.

It was Common for the
Pavement to Just End!





There was much interest concerning the asphalt-rubber chip seal on the Navajo Nation. We had visitors from various agencies as the project progressed.





Special Thanks To:

The Bureau of Indian Affairs – Gallup New Mexico

(Irvin Bekis, Herby Larson, Alfred Myron, Alfred Reed and all of our COR's and inspectors)

The Bureau of Indian Affairs – Phoenix Arizona (Joe Cano)

International Surfacing Systems

(Greg Erks, Dick Armstrong and the ISS chip seal crews)

Our PG Asphalt Supplier (~~Paramount Petroleum~~)

Our Rubber Supplier (Crumb Rubber Manufacturers)

Our Emulsion Supplier (Quality Emulsions)

Our Four Aggregate Suppliers

(Fann Contracting, Brimhall Construction, Consolidated Aggregates and C & E Concrete)

Aggregate Transport (Mundall Trucking)

QA/QC (AMEC (MacTec) Engineering)



Questions?