



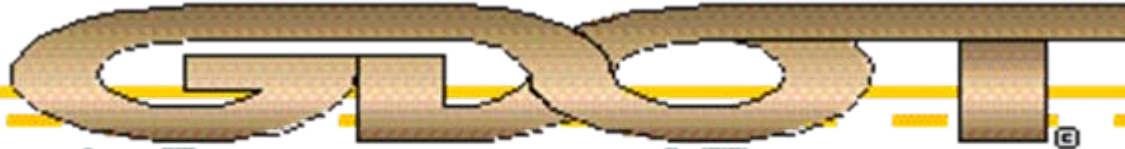
FDR

Recycling Whole Roads!

2006 S.E. States Pavement Management & Design Conference

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Technical Services Manager**





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Objectives

- Applications
- Performance
- Design
- Construction
- Cost





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“Definition of Reclamation”

A rehabilitation process which utilizes the existing asphalt, base, and subgrade material to produce a new stabilized base course for an asphalt, chip seal, or surface treatment wearing surface.

GDOT

- **Cement-Stabilized Reclaimed Base**
- **Lime-Stabilized Reclaimed Base**



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Georgia Public Roads

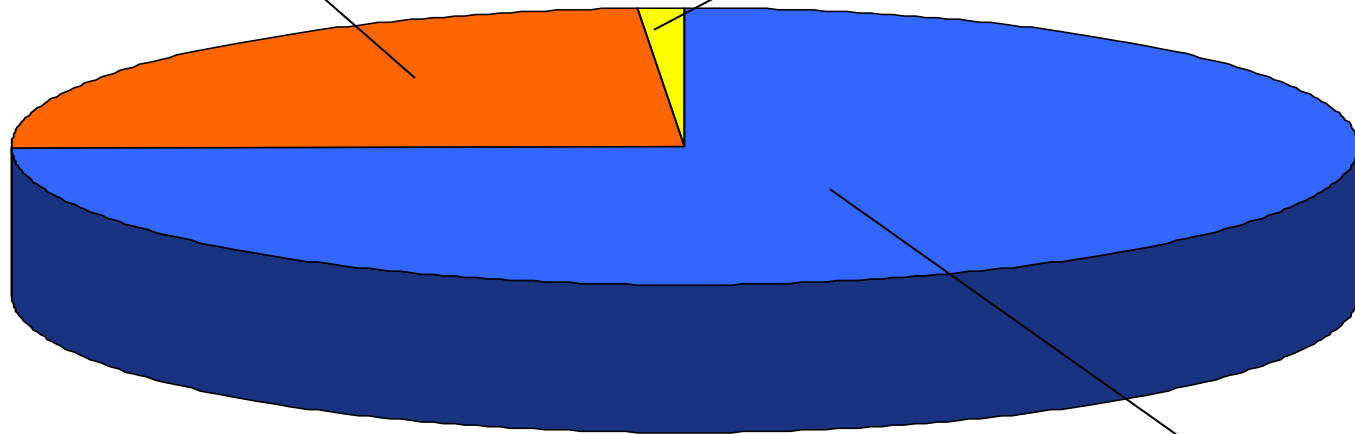
115,533 Centerline Miles

Urban (23.3%)

26,919 miles

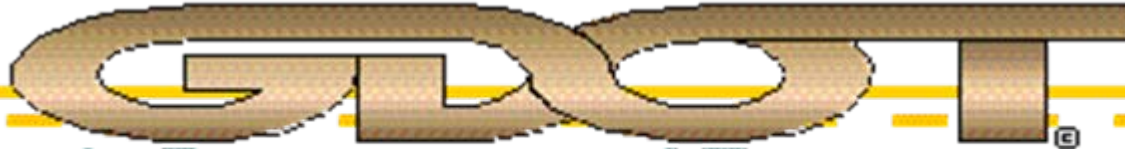
Interstate (1.1%)

1,271 miles



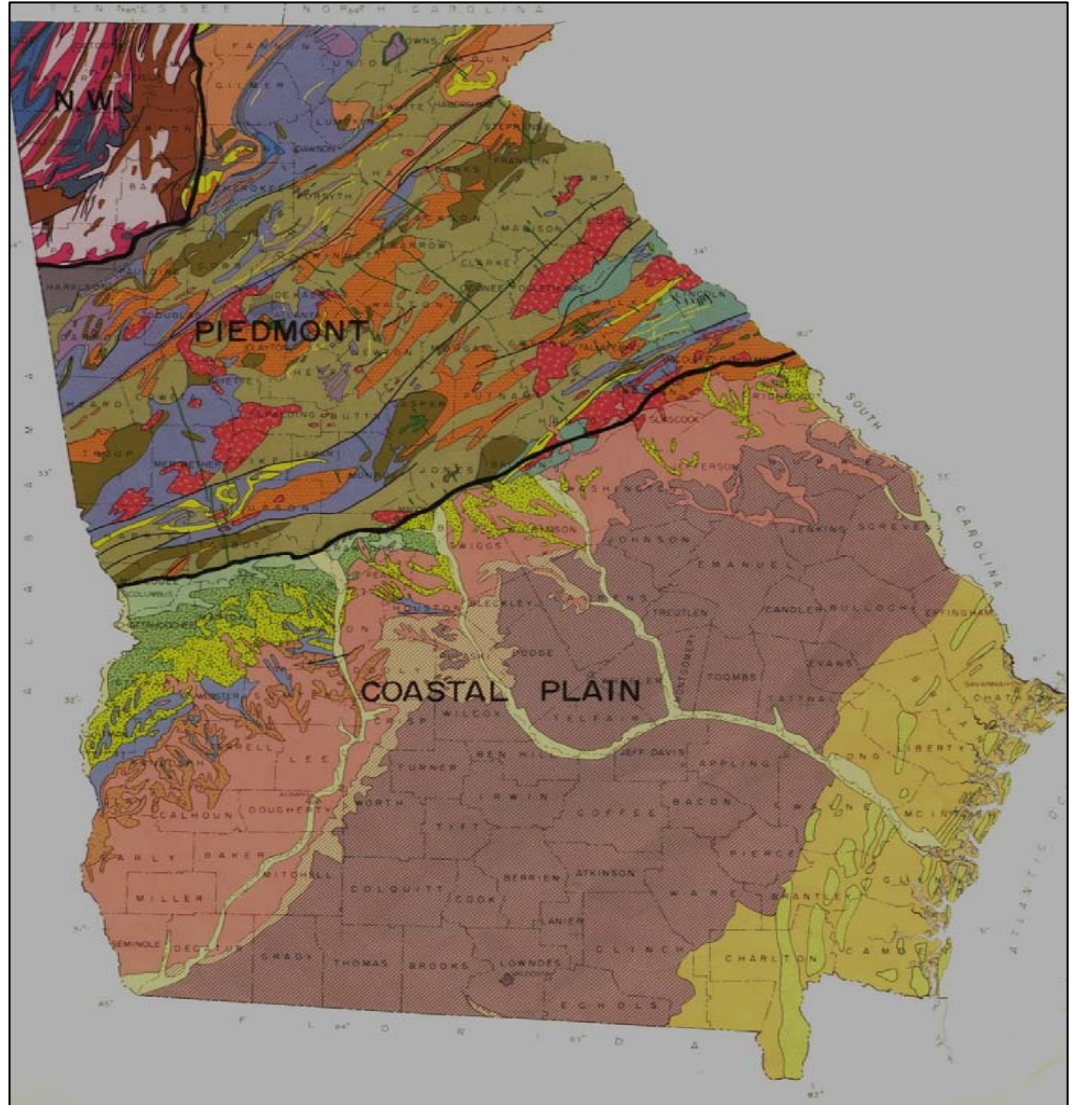
Rural (75.6%)

87,343 miles



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Georgia's Geologic Provinces



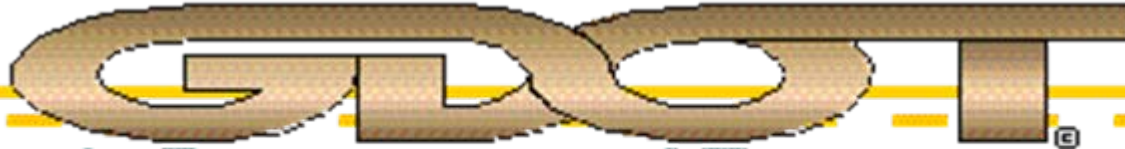


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Challenges Facing Georgia's Roadways

- Continuing Growth
- Rising Expectations from Users
- A Heavily Used, Aging System
- Environmental Compatibility
- Changes in the Workforce
- Funding Limitations





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Pavement Distress



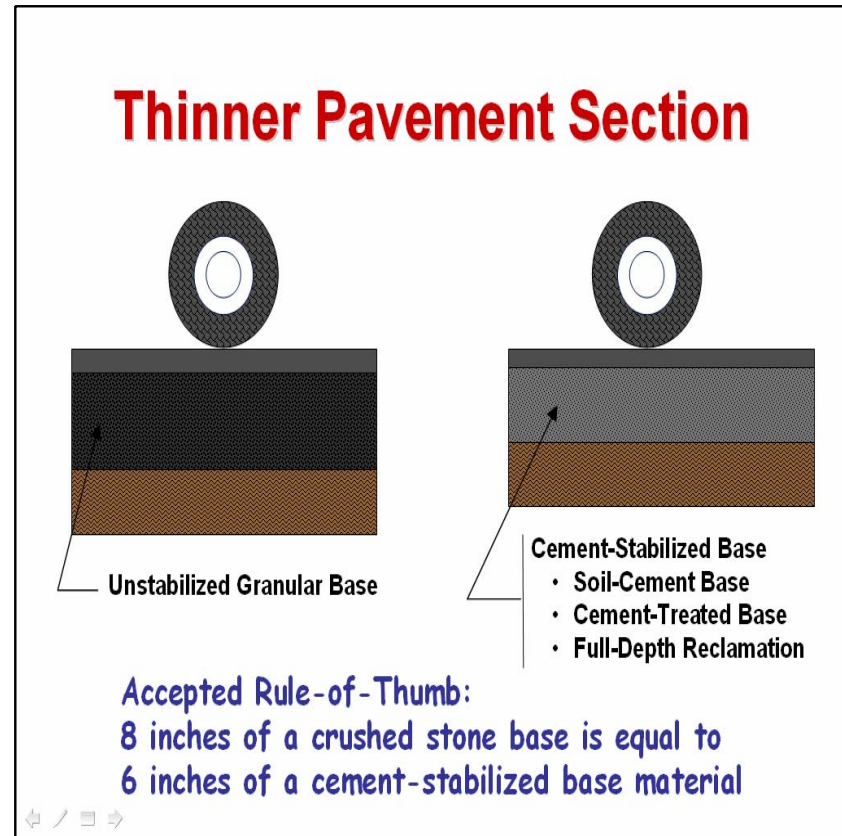
Advantages of Reclamation

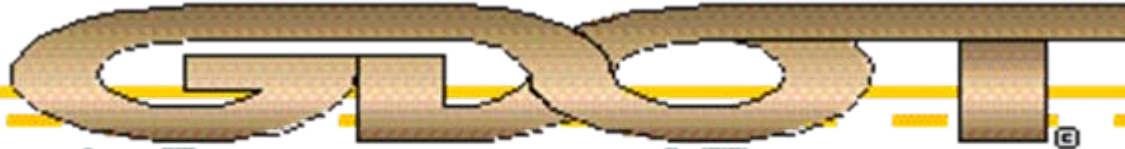
- Use of in-place materials
- Little or no material hauled off and dumped
- Maintains or improves existing grade
- Conserves virgin material
- Saves cost by using in-place "investment"
- Saves energy by reducing mining and hauls
- Environmentally friendly



Engineering Benefits

- Increased Rigidity
Spreads Loads
- Eliminates Rutting
Below Surface
- Reduced Moisture
Susceptibility
- Reduced Fatigue
Cracking
- Thinner Pavement
Section
- Retards Reflective
Cracking





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Mix Design Proportioning

- Obtain representative samples of roadway material
- Typically up to 50% >Asphalt, Aggregate Base, Soil-Cement
 - Meeting the gradation requirement is the key
- Pulverize to anticipated gradation
 - 100% passing 75 mm (3")
 - 95% passing 50 mm (2")
 - 55% passing 4.75 mm (#4)
- Estimate cement content
 - Usually 4 to 8%
 - By weight of dry material
- Run moisture/density curve
 - Standard Proctor
 - (ASTM D558)





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Clearing



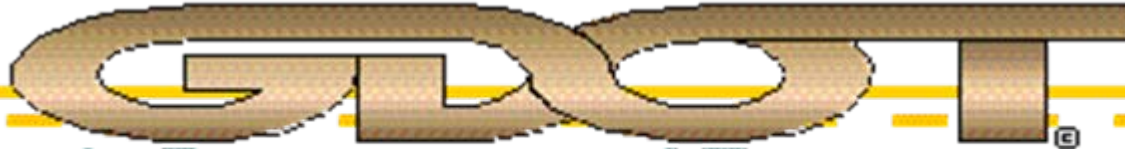


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Pulverization

- Pulverization is appropriate for
- Typical





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Spreading (Dry)

- Cement
of road
amount



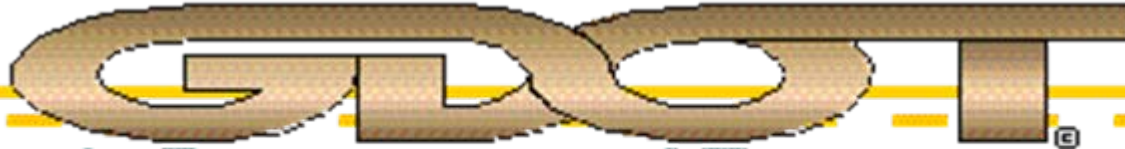


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Blending of Materials

- Continuous blending of materials until a homogenous blend is achieved.





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Compaction

- Material is compacted
- 98% minimum standard Proctor density





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Moisture Addition

- Water is added to optimum moisture



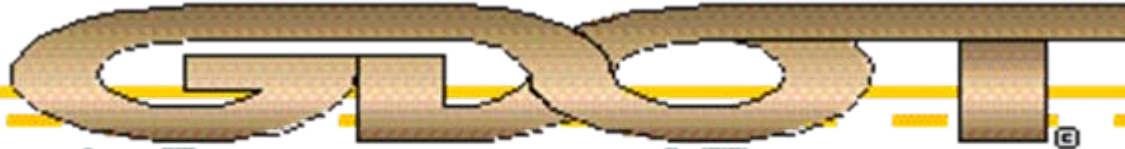


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Grading

- Material
approach
and c





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Curing



Surface Application

- Hot Mix Asphalt
- Chip Seal
- Surface Treatment



Quality Acceptance Testing



Gradation

- 95% Passing 2-inch sieve
- 55% Passing the No.4 sieve

Compaction/Moisture

- 98% of Max. Dry Density
- 100% to 120% of Optimum

Depth

- +/- $\frac{1}{2}$ -inch

Strength

- 300psi Min. Unconfined Compressive Strength

Cost Analysis

Conventional Reconstruction

Excavating (Milling) the 2-inch paving course and disposal.	\$1.00 sq. yd	@ 14,000 sq. yd. = \$14,000	
Mixing, Compacting, Grading the existing Sand-Clay Base for a Subgrade (not including the removal and replacement of unsuitable material)	\$.075 sq. yd	@ 14,000 sq. yd. = \$10,500	
3-inches of 25mm paving	\$43.67 per ton	@ 14,000 sq. yd. =\$100,877.70	<u>Total</u> \$ 239,734.25
2-inches of 19 mm paving	\$43.71 per ton	=\$67,313.40	
1.5-inches of 9.5 mm paving	\$40.73 per ton	=\$47,043.15	

Cost Analysis

Cement Stabilized Reclaimed Base

Reclamation Process (including mixing, compacting, and grading)	\$ 4.03 per sq. yd.	@ 14,000 sq. yd. = \$56,420	
Type 1 Portland Cement	\$ 125.00 per ton	@ 259 tons =\$32,375	
2-inches of 19 mm paving	\$43.71 per ton	@ 14,000 sq. yd. =\$50,485.05	<u>Total</u> \$ 139,280.05



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Cost Analysis

42%

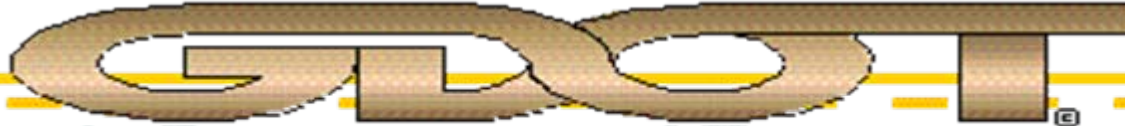
34.25

Cement Subgrade Reclaimed Base

30.05

Cost Savings

\$100,454.20



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**The traveling public in Georgia
are the big winners!**



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