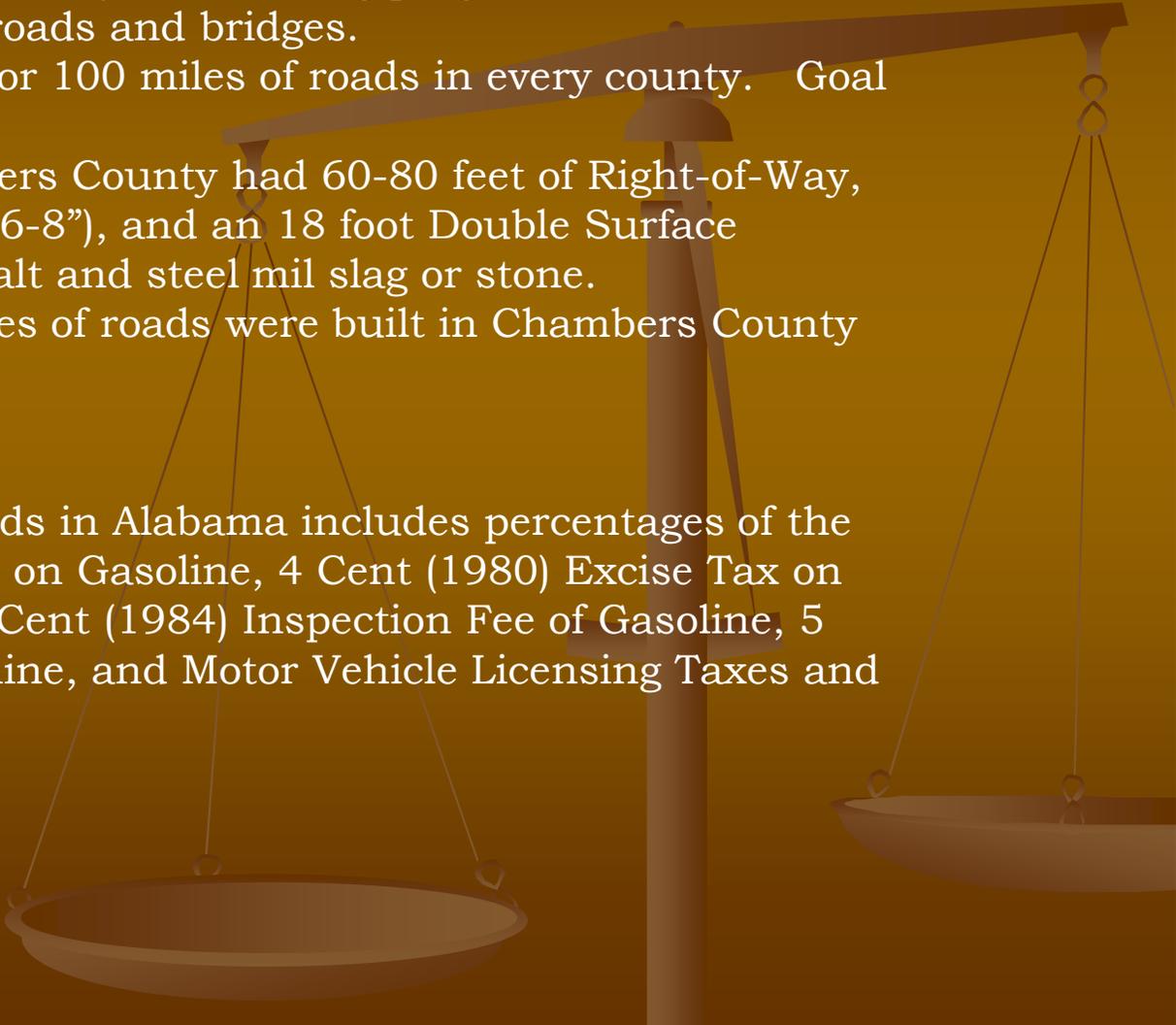


IMPLEMENTING FULL DEPTH RECLAMATION

BY: HENRY HAWKINS
CHAMBERS COUNTY ENGINEER



BRIEF HISTORY OF ALABAMA COUNTY ROADS

- Alabama “Farm to Market Act” was passed in 1943 and began in 1946
 - One Cent was set aside from the state gasoline tax to be equally distributed 67 ways on a 50/50 matching program to be used in the construction of roads and bridges.
 - Ten year goal was set for 100 miles of roads in every county. Goal was met in 1955.
 - Typical road in Chambers County had 60-80 feet of Right-of-Way, 20 feet of topsoil base (6-8”), and an 18 foot Double Surface Treatment composed of AC asphalt and steel mill slag or stone.
 - Approximately 200 miles of roads were built in Chambers County during this program.
 - Ended in 1970
 - Current funding for County Roads in Alabama includes percentages of the State’s 7 Cent (1977) Excise Tax on Gasoline, 4 Cent (1980) Excise Tax on Gasoline and Lubricating Oil, 2 Cent (1984) Inspection Fee of Gasoline, 5 Cent (1992) Excise Tax on Gasoline, and Motor Vehicle Licensing Taxes and Registration Fees.
- 



***UNFORTUNATELY, WE HAVE A LOT OF ROADS
THAT ARE SIMILAR TO THIS...***

A photograph of a gravel road curving to the right, bordered by green grass and trees. The road surface shows signs of wear and some patches. A rainbow is visible in the bottom left corner of the image. The text is centered over the road.

**ORIGINALLY BUILT IN THE 1950'S, ONLY
MAINTENANCE
HAS BEEN POT HOLE PATCHING, CLIPPING, AND
MOWING**

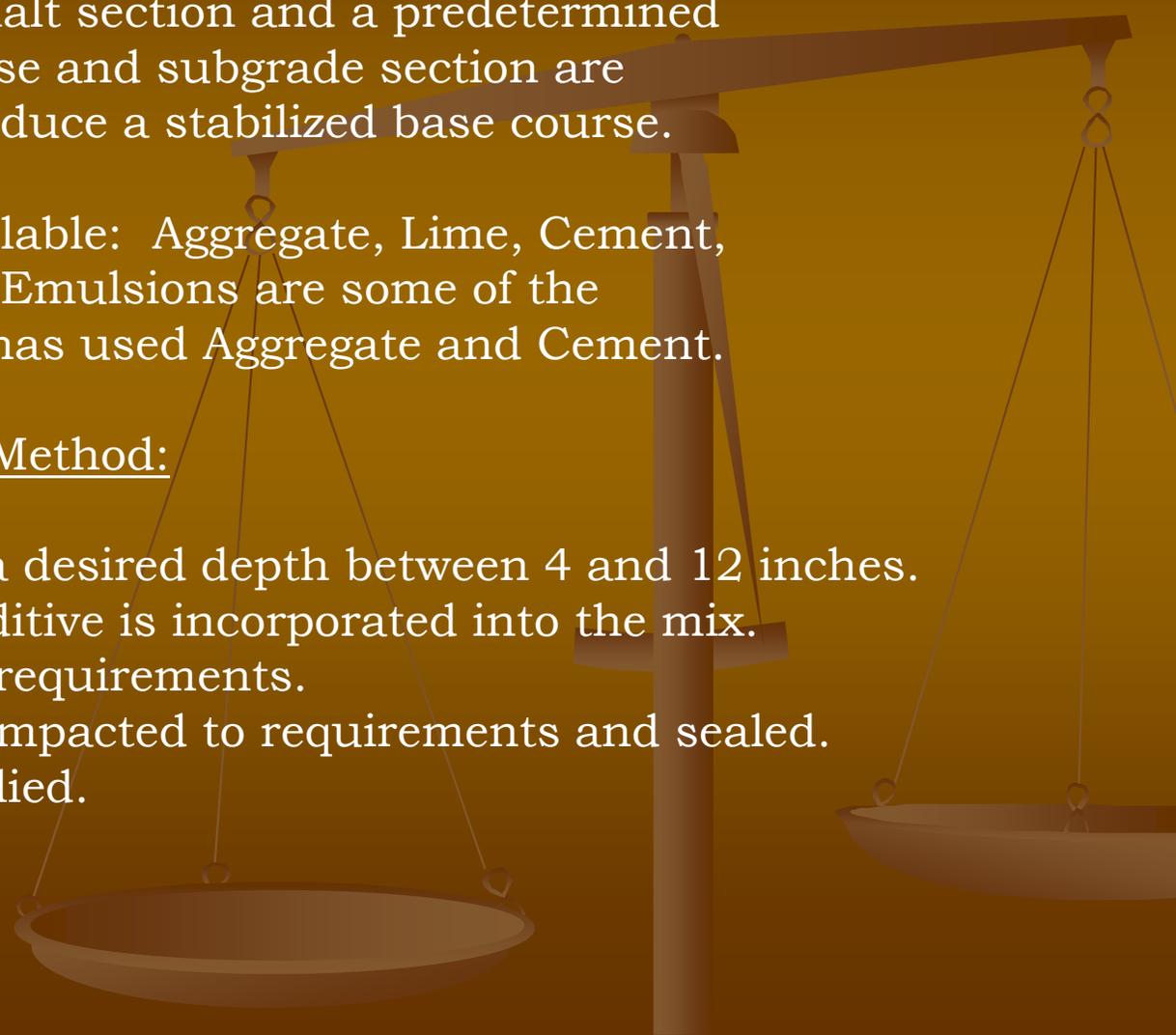
WHAT IS FULL DEPTH RECLAMATION?

-Full Depth Reclamation (FDR) has been defined as a recycling method where all of the asphalt section and a predetermined amount of the underlying base and subgrade section are pulverized and treated to produce a stabilized base course.

-Different treatments are available: Aggregate, Lime, Cement, Foamed Asphalt, and Liquid Emulsions are some of the choices. Chambers County has used Aggregate and Cement.

Most Common Construction Method:

- 1) Material is pulverized to a desired depth between 4 and 12 inches.
- 2) A specified amount of additive is incorporated into the mix.
- 3) The mixture is graded to requirements.
- 4) The graded material is compacted to requirements and sealed.
- 5) A Wearing Surface is applied.



PRELIMINARY TESTING

ONCE FDR IS CHOSEN AS THE PROCESS THAT IS NEEDED TO CORRECT OUR PROJECT, CHAMBERS COUNTY PERFORMS THE FOLLOWING:

ATTERBERG LIMITS – Liquid limit, Plastic limit, Plasticity Index.

AASHTO SOIL CLASSIFICATION

MOST OF OUR ROADS HAVE A SANDY/TOP SOIL TYPE BASE, MAKING THEM EXCELLENT CANDIDATES FOR FDR W/ CEMENT STABILIZATION

Test for Strength

■ Unconfined Compressive Strength Testing

- Used by most State DOT's
- Simple and quick procedure
- Typically test the samples @ 4 and 6% Cement
- 7-day strengths ranging from 300 psi to 400 psi are generally recommended







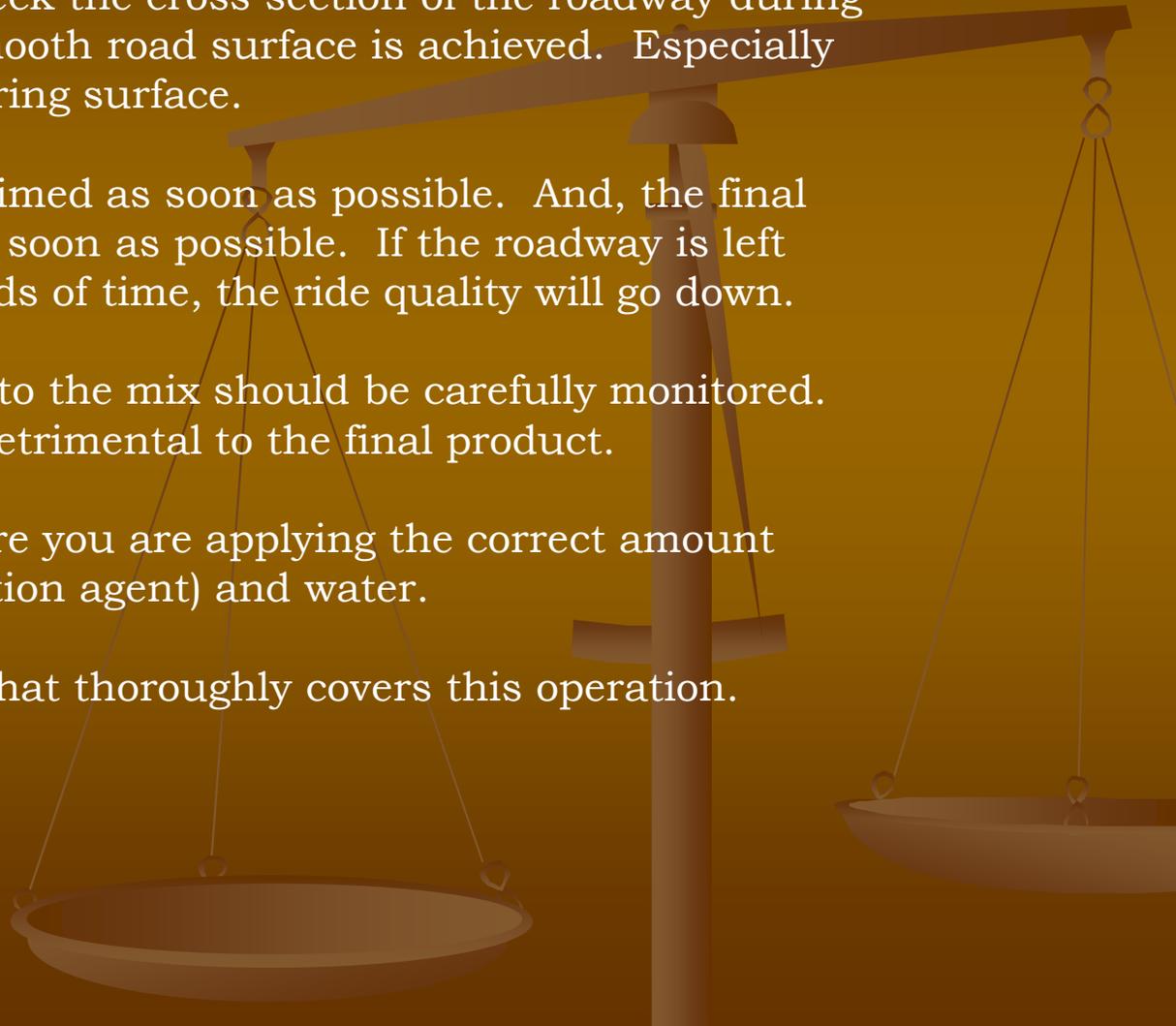




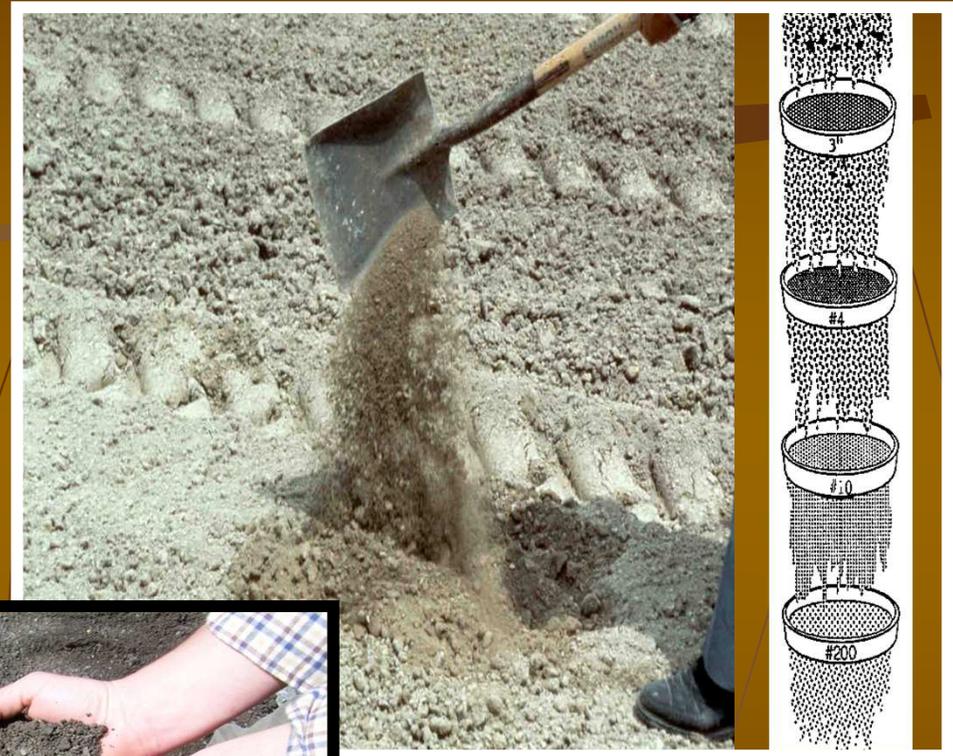


WHAT HAVE WE LEARNED?

- An experienced motor grader operator is essential for this process. Inspectors should constantly check the cross section of the roadway during construction to ensure that a smooth road surface is achieved. Especially if a surface treatment is the wearing surface.
- The graded surface should be primed as soon as possible. And, the final surface should also be placed as soon as possible. If the roadway is left “unprotected” for extended periods of time, the ride quality will go down.
- Water and Cement introduction to the mix should be carefully monitored. Too much or too little could be detrimental to the final product.
- Always sample your soil to ensure you are applying the correct amount of cement (or any other stabilization agent) and water.
- ALDOT has a Special Provision that thoroughly covers this operation.



Quality Control Testing



Gradation

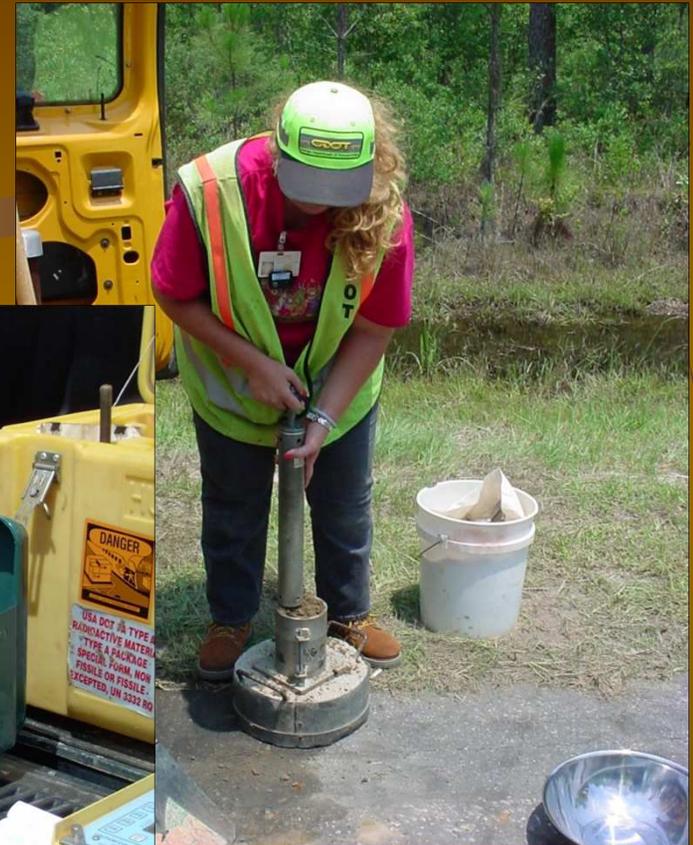
Quality Control Testing



Check Spread Rate



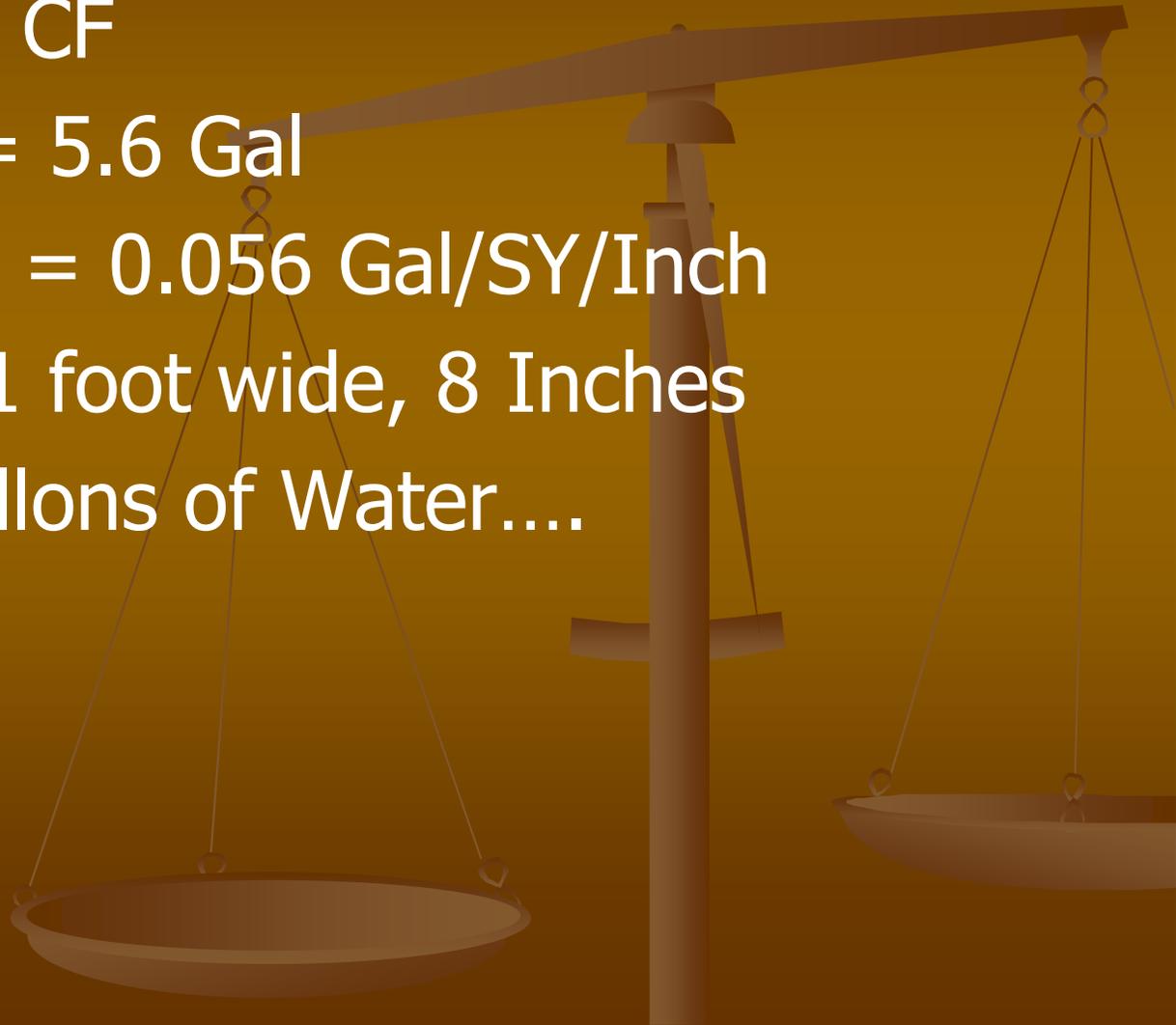
Quality Control Testing



Density / Moisture

It Takes A Lot of Water!

- 1 SY at 1" is 0.75 CF
- @ 7.464 Gal/CF = 5.6 Gal
- Adding 1% water = 0.056 Gal/SY/Inch
- One Lane Mile, 11 foot wide, 8 Inches Deep = 2,892 Gallons of Water....

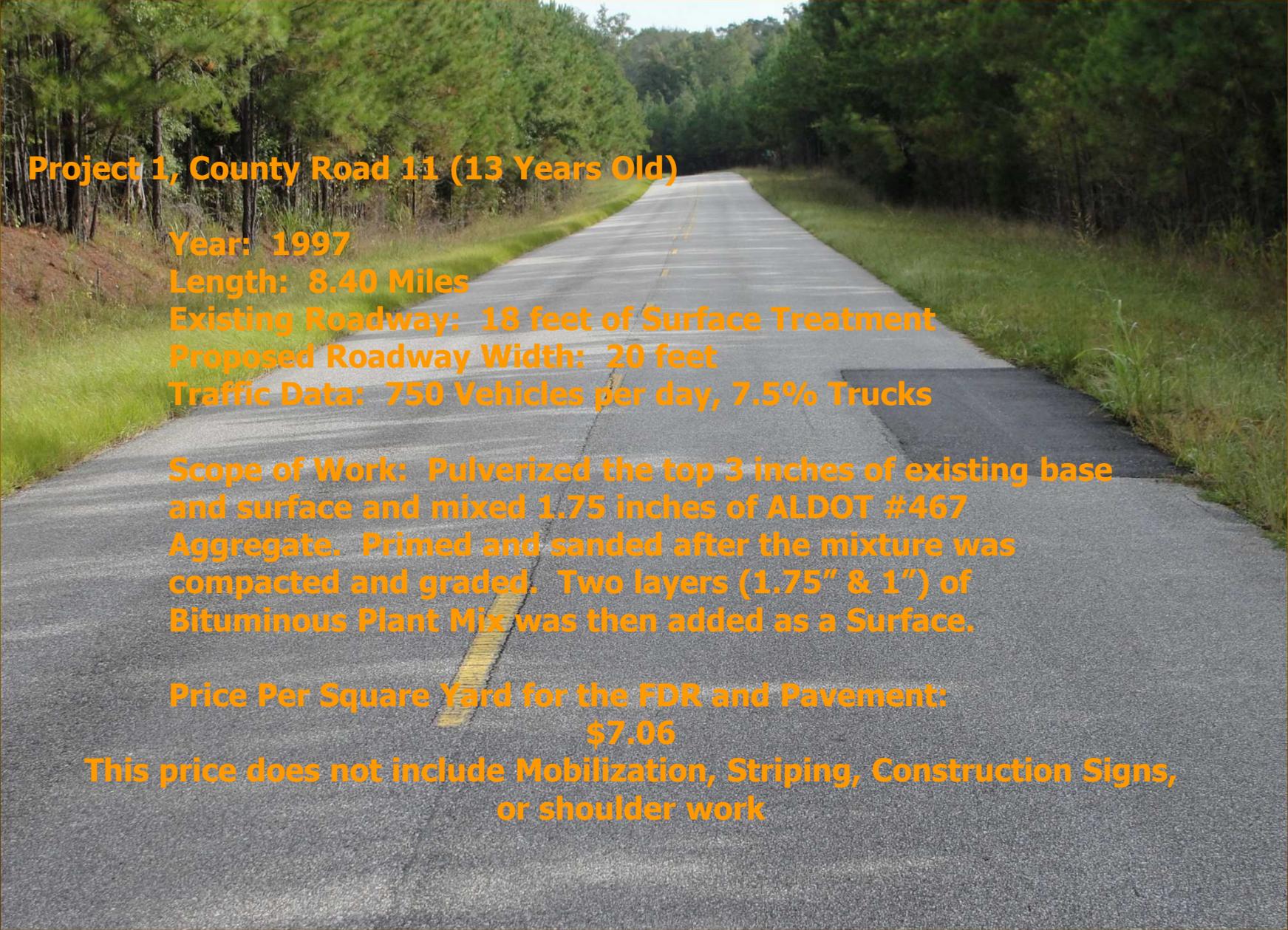


CHAMBERS COUNTY FDR PROJECTS

WE HAVE COMPLETED 3 PROJECTS, 14.99 MILES, UTILIZING FDR W/AGGREGATE STABILIZATION. THESE PROJECTS WERE FEDERALLY FUNDED.

WE HAVE COMPLETED 8 PROJECTS, 19.95 MILES, UTILIZING FDR W/ CEMENT STABILIZATION. 2 OF THESE PROJECTS WERE FEDERALLY FUNDED AND 6 WERE LOCALLY FUNDED.

WE PLAN TO COMPLETE 1 FEDERALLY FUNDED FDR W/ CEMENT STABILIZATION PROJECT, 5.76 MILES, LATER IN THE YEAR.



Project 1, County Road 11 (13 Years Old)

Year: 1997

Length: 8.40 Miles

Existing Roadway: 18 feet of Surface Treatment

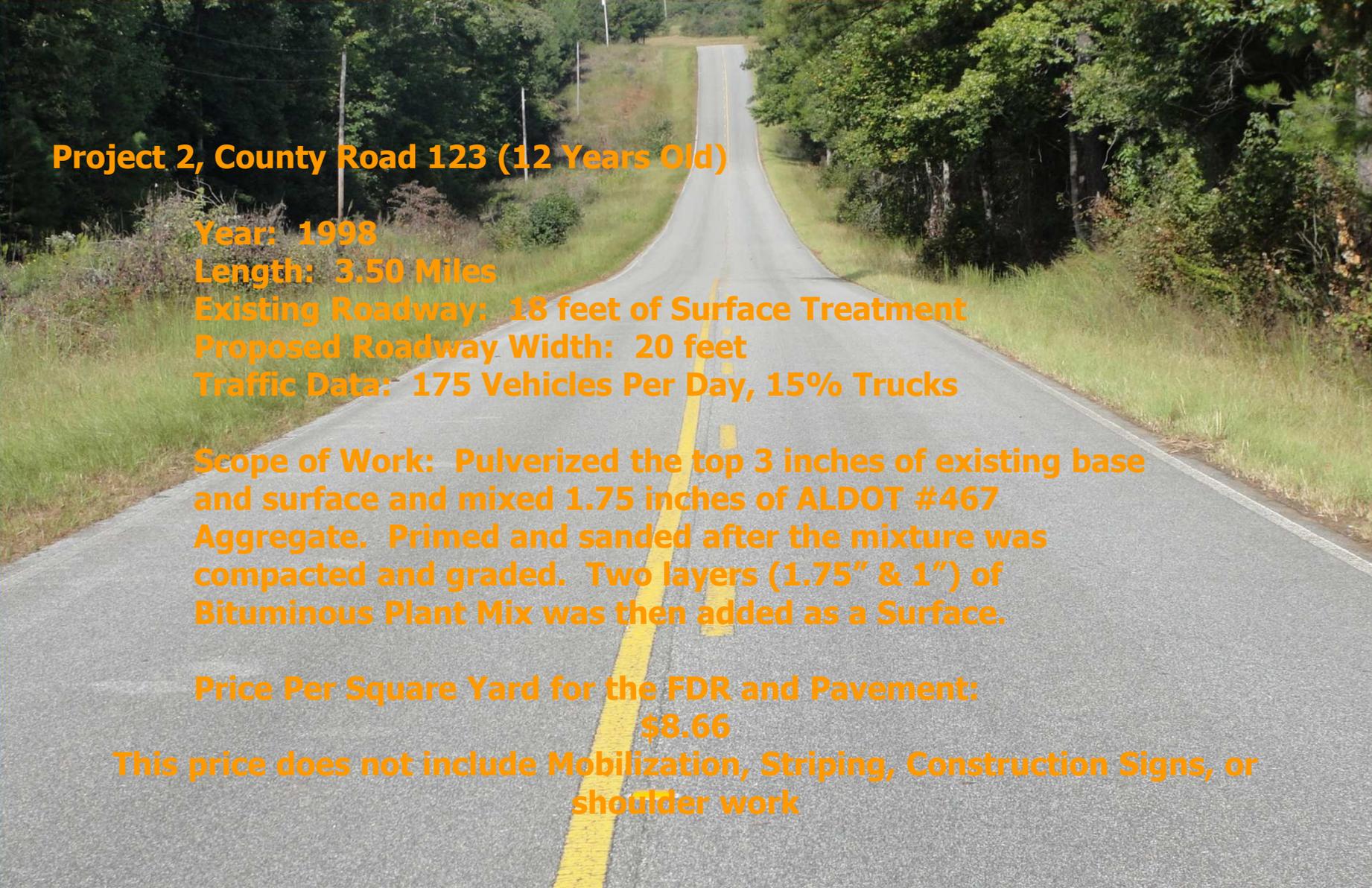
Proposed Roadway Width: 20 feet

Traffic Data: 750 Vehicles per day, 7.5% Trucks

Scope of Work: Pulverized the top 3 inches of existing base and surface and mixed 1.75 inches of ALDOT #467 Aggregate. Primed and sanded after the mixture was compacted and graded. Two layers (1.75" & 1") of Bituminous Plant Mix was then added as a Surface.

**Price Per Square Yard for the FDR and Pavement:
\$7.06**

**This price does not include Mobilization, Striping, Construction Signs,
or shoulder work**



Project 2, County Road 123 (12 Years Old)

Year: 1998

Length: 3.50 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

Traffic Data: 175 Vehicles Per Day, 15% Trucks

Scope of Work: Pulverized the top 3 inches of existing base and surface and mixed 1.75 inches of ALDOT #467 Aggregate. Primed and sanded after the mixture was compacted and graded. Two layers (1.75" & 1") of Bituminous Plant Mix was then added as a Surface.

**Price Per Square Yard for the FDR and Pavement:
\$8.66**

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 3, County Road 177 (4 Years Old)

Year: 2006

Length: 3.09 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

Traffic Data: 815 Vehicles Per Day, 4.5% Trucks

Scope of Work: Pulverized the top 3 inches of existing base and surface and mixed 2.00 inches of ALDOT #467 Aggregate. Primed and sanded after the mixture was compacted and graded. A triple Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$10.39

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 4, County Road 389 (2 Years Old)

Year: 2008

Length: 4.46 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

Traffic Data: 375 Vehicles Per Day, 13% Trucks

Scope of Work: Pulverized the top 6 inches of existing base and surface and mixed 30 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

**Price Per Square Yard for the FDR and Pavement:
\$8.83**

**This price does not include Mobilization, Striping, Construction Signs,
or shoulder work**



Project 5, County Road 267 (1 Year Old)

Year: 2009

Length: 5.57 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

Traffic Data: 800 Vehicles Per Day, 6% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 32 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$8.19

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 6, County Road 181 (2 Months Old)

Year: 2010

Length: 1.78 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

Traffic Data: 340 Vehicles Per Day, 13% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 32 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$7.13

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 7, County Road 22 (2 Months Old)

Year: 2010

Length: 2.30 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

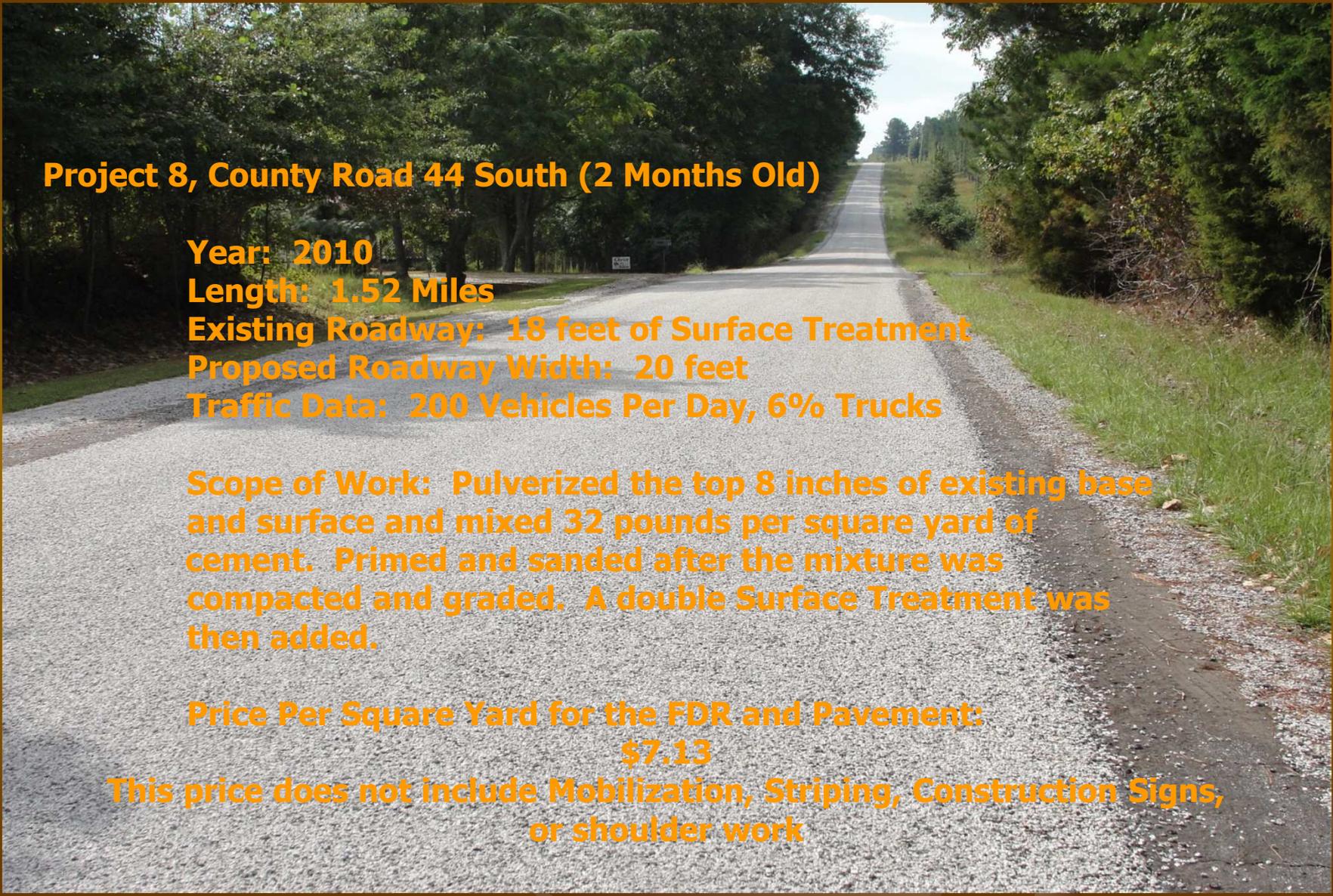
Traffic Data: 75 Vehicles Per Day, 10% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 32 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$7.13

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 8, County Road 44 South (2 Months Old)

Year: 2010

Length: 1.52 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 20 feet

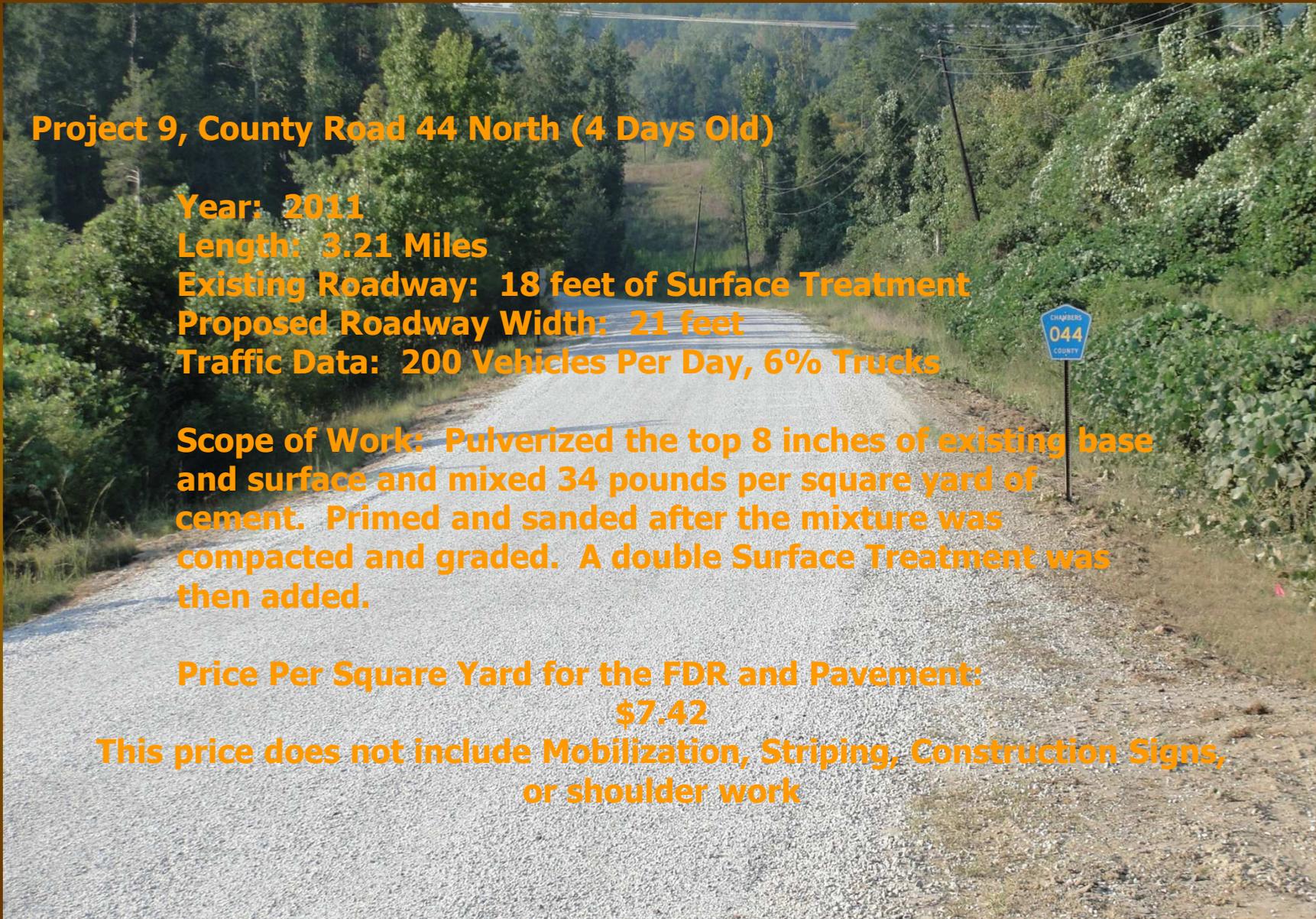
Traffic Data: 200 Vehicles Per Day, 6% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 32 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$7.13

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 9, County Road 44 North (4 Days Old)

Year: 2011

Length: 3.21 Miles

Existing Roadway: 18 feet of Surface Treatment

Proposed Roadway Width: 21 feet

Traffic Data: 200 Vehicles Per Day, 6% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 34 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$7.42

This price does not include Mobilization, Striping, Construction Signs, or shoulder work



Project 10, County Road 45 (4 Days Old)

Year: 2011

Length: 0.52 Miles

Existing Roadway: 16 feet of Surface Treatment

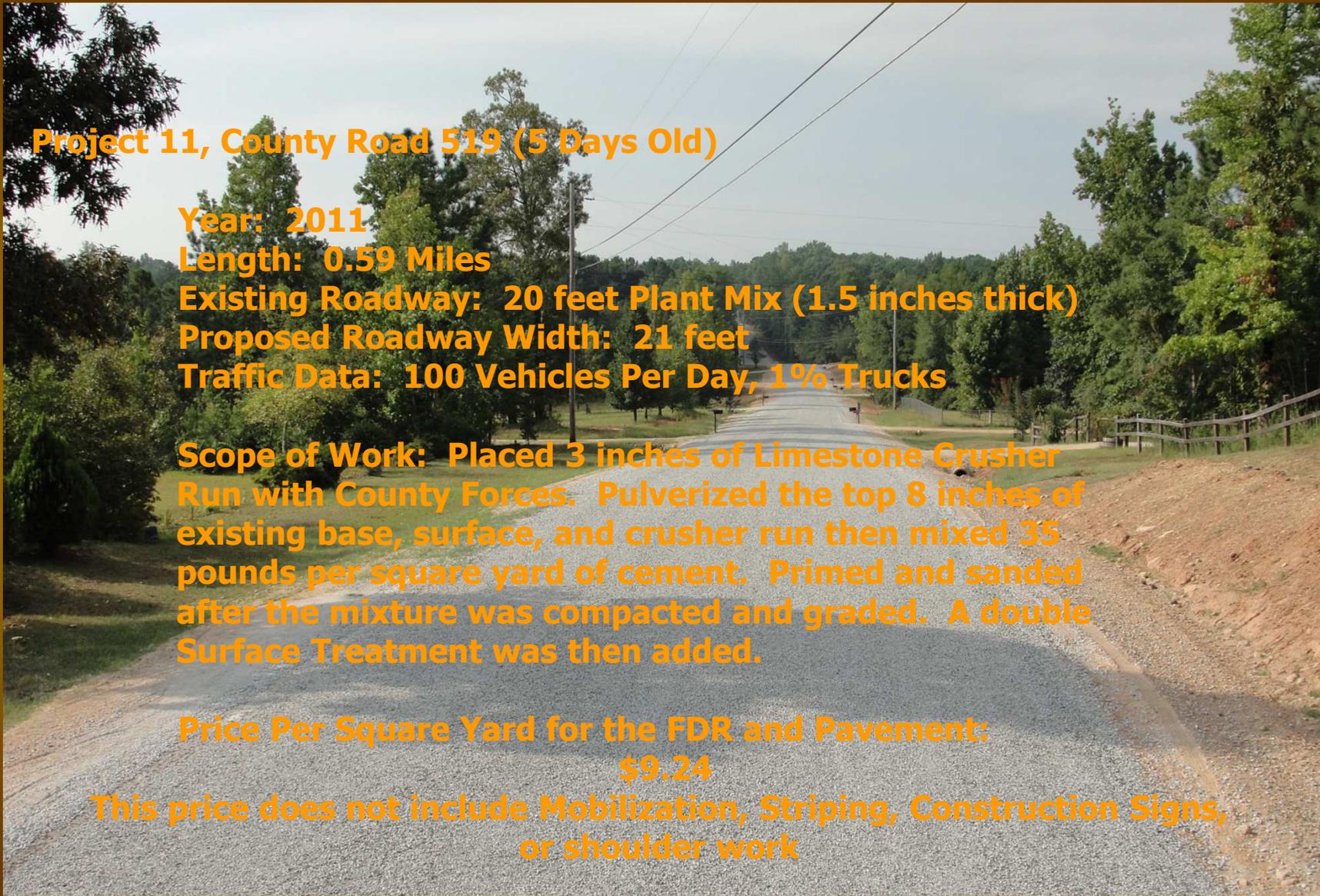
Proposed Roadway Width: 18 feet

Traffic Data: 75 Vehicles Per Day, 1% Trucks

Scope of Work: Pulverized the top 8 inches of existing base and surface and mixed 34 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

**Price Per Square Yard for the FDR and Pavement:
\$7.42**

**This price does not include Mobilization, Striping, Construction Signs,
or shoulder work**



Project 11, County Road 519 (5 Days Old)

Year: 2011

Length: 0.59 Miles

Existing Roadway: 20 feet Plant Mix (1.5 inches thick)

Proposed Roadway Width: 21 feet

Traffic Data: 100 Vehicles Per Day, 1% Trucks

Scope of Work: Placed 3 inches of Limestone Crusher Run with County Forces. Pulverized the top 8 inches of existing base, surface, and crusher run then mixed 35 pounds per square yard of cement. Primed and sanded after the mixture was compacted and graded. A double Surface Treatment was then added.

Price Per Square Yard for the FDR and Pavement:

\$9.24

This price does not include Mobilization, Striping, Construction Signs, or shoulder work

CONTRACTED RESURFACING ESTIMATES (NO WIDENING)

#1 Patching @ 50 Tons Per Mile
Spot Leveling @ 40 lbs/SY
Wearing Surface @ 175 lbs/SY
2 Applications of Tack Coat
Aggregate Surfacing for Shoulder Flushing
\$8.91 PER SY

#2 Patching @ 50 Tons Per Mile
Spot Leveling @ 40 lbs/SY
Binder Leveling @ 190-200 lbs/SY
Wearing Surface @ 135 lbs/SY
3 Applications of Tack Coat
Aggregate Surfacing for Shoulder Flushing
\$14.63 PER SY

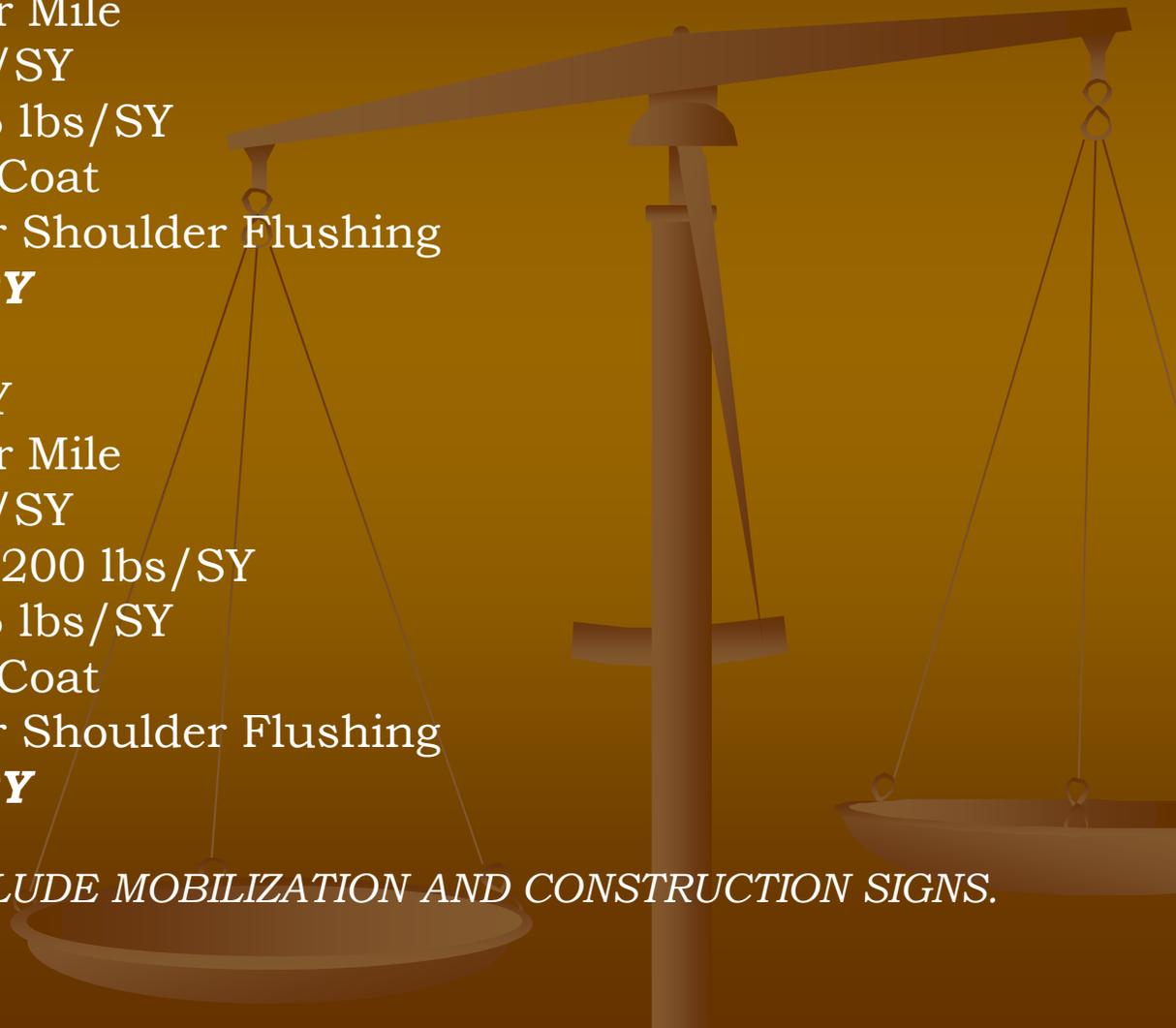
THESE ESTIMATES DO NOT INCLUDE MOBILIZATION AND CONSTRUCTION SIGNS.

CONTRACTED RESURFACING ESTIMATES (1 FOOT OF WIDENING, EACH SIDE)

#1 Widening @ 330 lbs/SY
Patching @ 50 Tons Per Mile
Spot Leveling @ 40 lbs/SY
Wearing Surface @ 175 lbs/SY
2 Applications of Tack Coat
Aggregate Surfacing for Shoulder Flushing
\$10.23 PER SY

#2 Widening @ 330 lbs/SY
Patching @ 50 Tons Per Mile
Spot Leveling @ 40 lbs/SY
Binder Leveling @ 190-200 lbs/SY
Wearing Surface @ 135 lbs/SY
3 Applications of Tack Coat
Aggregate Surfacing for Shoulder Flushing
\$15.95 PER SY

THESE ESTIMATES DO NOT INCLUDE MOBILIZATION AND CONSTRUCTION SIGNS.

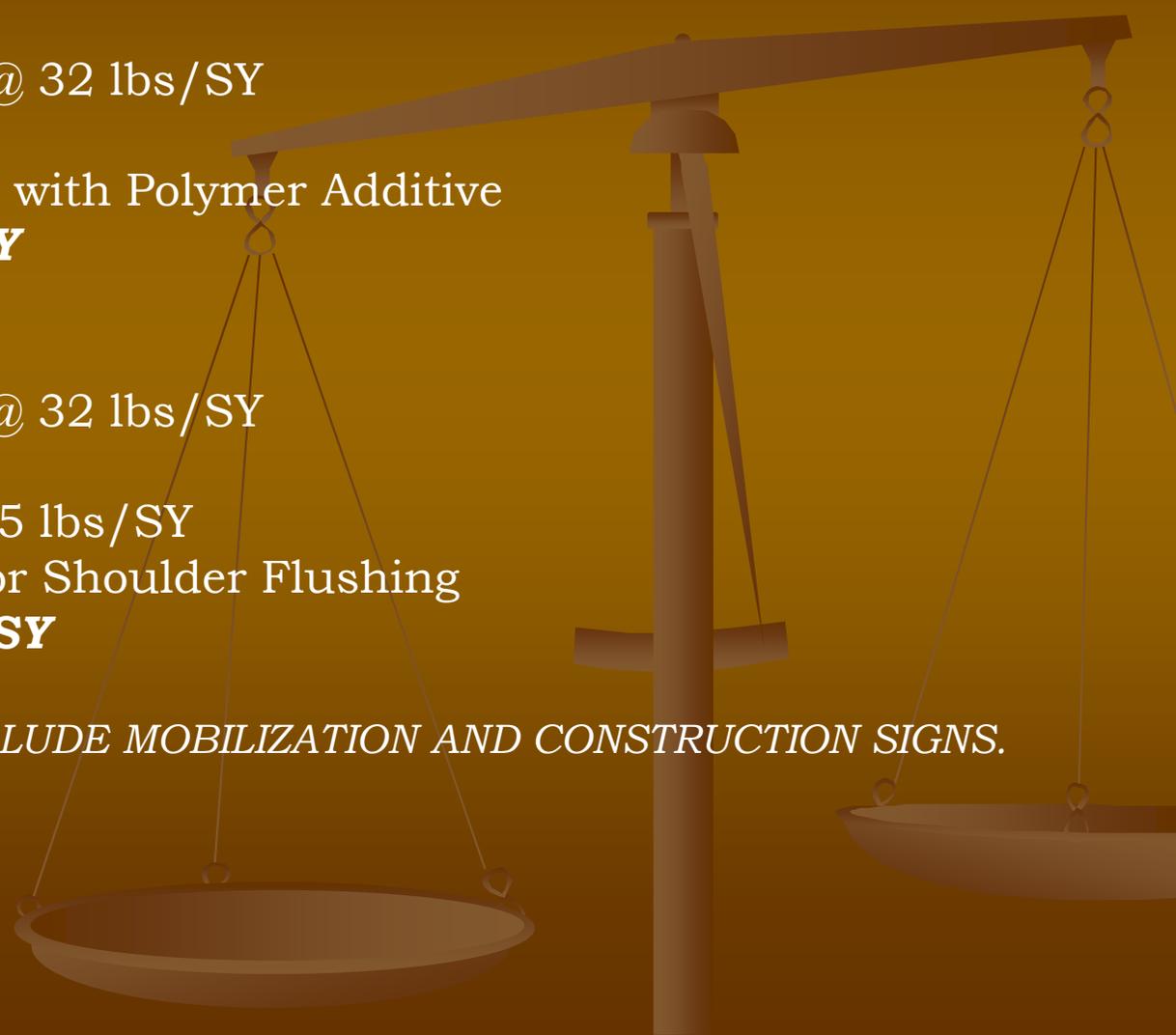


CONTRACTED FULL DEPTH RECLAMATION WITH CEMENT STABILIZATION ESTIMATES

#1 FDR, 8 inches thick
Cement Stabilization @ 32 lbs/SY
Prime & Sand
JG Surface Treatment with Polymer Additive
\$9.14 PER SY

#2 FDR, 8 inches thick
Cement Stabilization @ 32 lbs/SY
Prime & Sand
Wearing Surface @ 175 lbs/SY
Aggregate Surfacing for Shoulder Flushing
\$12.29 PER SY

THESE ESTIMATES DO NOT INCLUDE MOBILIZATION AND CONSTRUCTION SIGNS.



CHAMBERS COUNTY CURRENT ANNUAL BID PRICES
FOR FULL DEPTH RECLAMATION WITH CEMENT
STABILIZATION

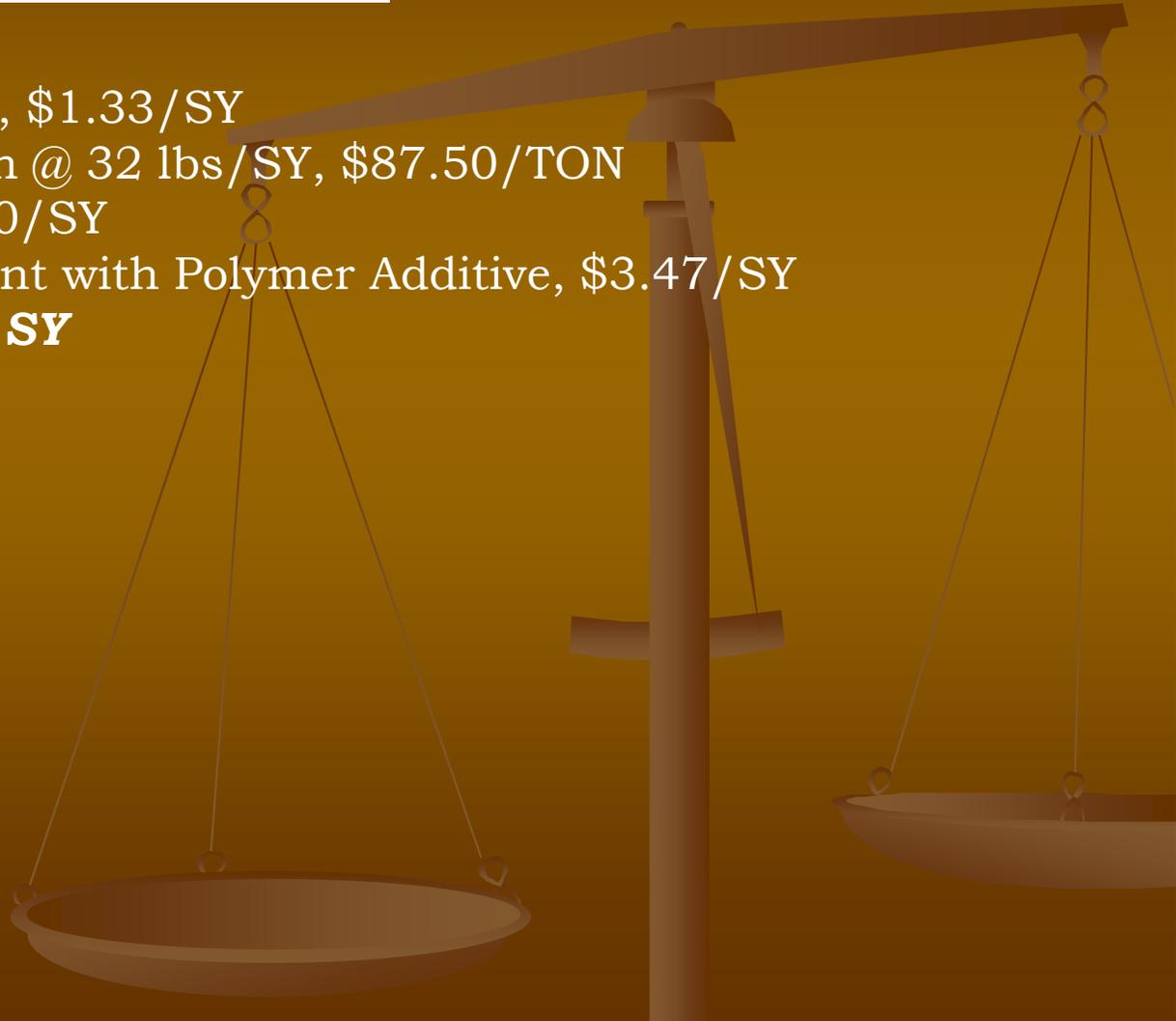
FDR, 8 inches thick, \$1.33/SY

Cement Stabilization @ 32 lbs/SY, \$87.50/TON

Prime & Sand, \$0.90/SY

JG Surface Treatment with Polymer Additive, \$3.47/SY

\$7.42 PER SY



QUESTIONS

