



**MoDOT
District 7
Route 71, McDonald County
Job No.'s J7P0601C,F, & I**

Project Summary and Historical Background

Historical Background:

Location of Project: from 0.9 mile south of Rte. EE to 2.1 miles south of Pineville.

Length: 5.4 miles

This section of Route 71 is a continuation of a corridor project to construct a 4 lane freeway facility from I-44 near Joplin to the Arkansas State Line near Bella Vista.

The first section of this corridor was completed in 1994 when the common method of estimating the cost of a project for programming was by using an average cost per mile. This proved to be fairly accurate for the next several miles of Route 71. But as the project proceeded south and the terrain changed and became rougher, the cost of the projects increased. Consequently, the amount that had been programmed for those projects and the actual cost of the project were getting further apart.

A Value Engineering study was held during the design of the project on April 12 through 16, 1999. This study identified several cost saving items but did not look at changing items related to the design criteria in the Project Development Manual.

In August/September 2001 a value engineering study was conducted to bring the overall cost of finishing the Route 71 down from an estimated \$131 million to \$89 million. This was a preamble to practical design and at the direction of Chief Engineer Kevin Keith. Several items were identified and we proceeded to redesign the remainder of the corridor.

Purpose and Need:

In the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Congress identified the north-south corridor from Kansas City, Missouri to Shreveport, Louisiana as a high priority corridor 1 (HPC1). HPC1 has been designated a future interstate route, and is commonly referred to as Interstate 49.

The purpose of relocating and replacing the existing Route 71 was to provide a 4-lane freeway facility from I-44 near Joplin to the Arkansas State Line near Bella Vista and comply with the objectives of ISTEA. The need was to address safety and traffic capacity issues.

The redesign of Route 71 addresses and stays true to the purpose of providing a 4-lane freeway facility. The use of a compressed median employs the use of a traffic barrier that is considered standard practice for this type of facility. The redesign also keeps in tact the safety and traffic

capacities issues but also will eliminate potential crossover crashes that are being prevented by guard cable on other corridors.

Scope Comparison:

This corridor was constructed up to this point using interstate design criteria per the Project Development Manual table 4-04.1. The design maintained a vertical grade no more than 4%, a 60' depressed median, and heavy duty pavements.

Over 33 miles of Route 71 had been completed from I-44 to south of Anderson Missouri using a standard depressed median and we always worked hard at eliminating any need for design exceptions. Prior to the formal announcement of practical design, Kevin Keith had given us a directive/challenge to cut cost. If we had not been given the flexibility to design the project differently, we would have continued to build the route using the same standards that had been employed in the previous projects.

Two major items that were to be redesigned stood out. The maximum vertical grade was changed to 5% Due to the rough terrain of southwestern McDonald County and typical section was revised to become a 14' compressed median with barrier curb.

New Techniques, method and non-traditional design:

Although no new techniques or methods were used in the re-design, it does reflect non-traditional design. We had a culture at MoDOT that was unable to wavier from our typical design. We were now directed to be innovative and employ design exceptions wherever practical. We had to bring the cost down to get the entire corridor finished.

Therefore we increased the grades and compressed the median and took a look at the traffic and decreased our pavement thicknesses. By increasing grades, and concluding that the earthwork need not balance, the profile grade was lowered and therefore the height of bridges were decreased. This led to significant savings in bridge costs.

Cost Savings

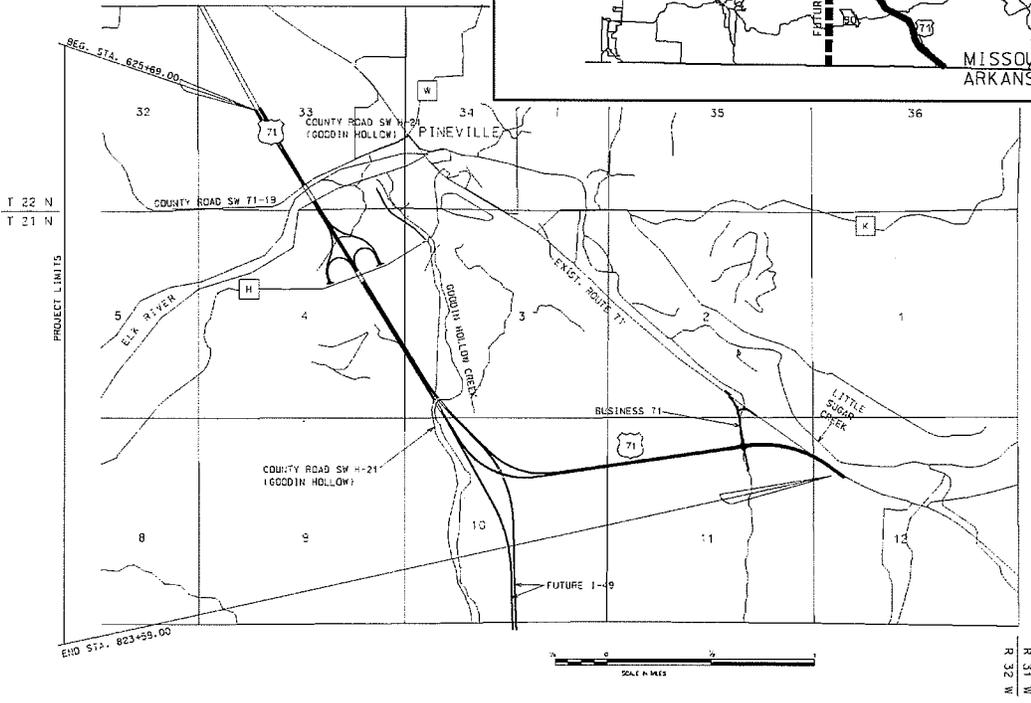
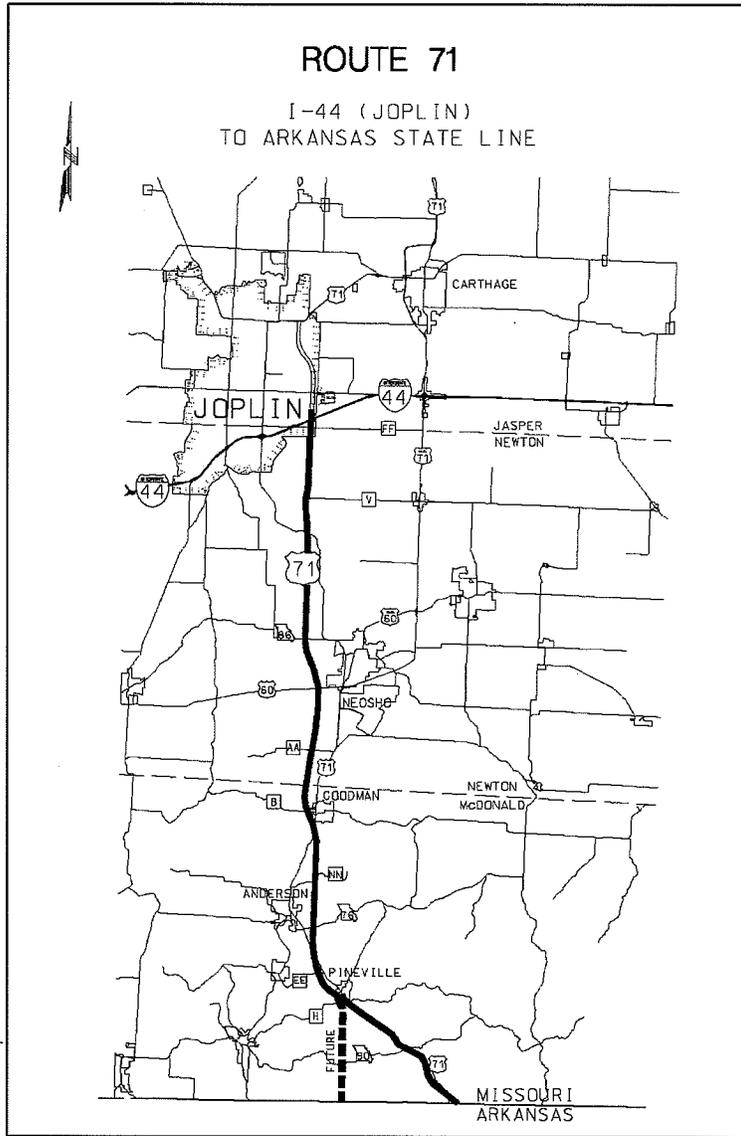
The cost savings for this project includes a combination of 3 projects that were let in combination. The total dollar figure of savings that resulted from the practical design efforts are shown in the backup material on pages 6 and 7.

Roadway User Expectations

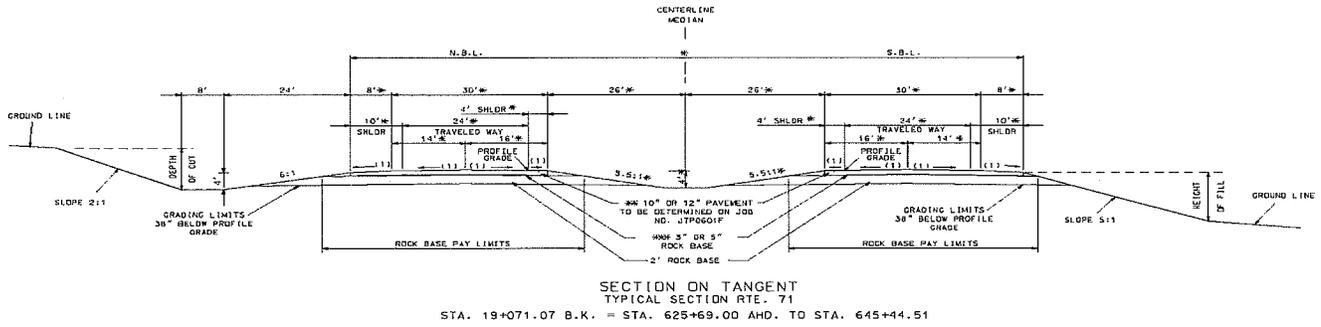
The average roadway user will not notice the difference in the design of the roadway. It is a relatively short section and traffic should be unimpeded and feel safe driving this stretch of this highway. The roadway is scheduled to be open to traffic in late 2007.

Purpose and Need:

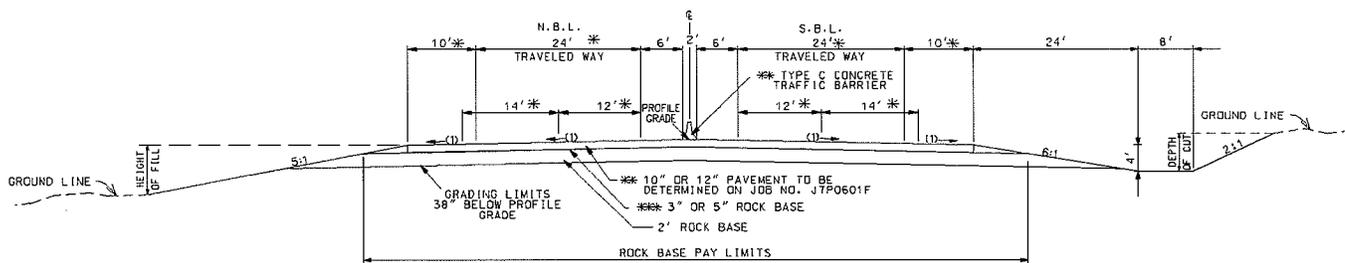
To Complete the Corridor



Scope Comparison:

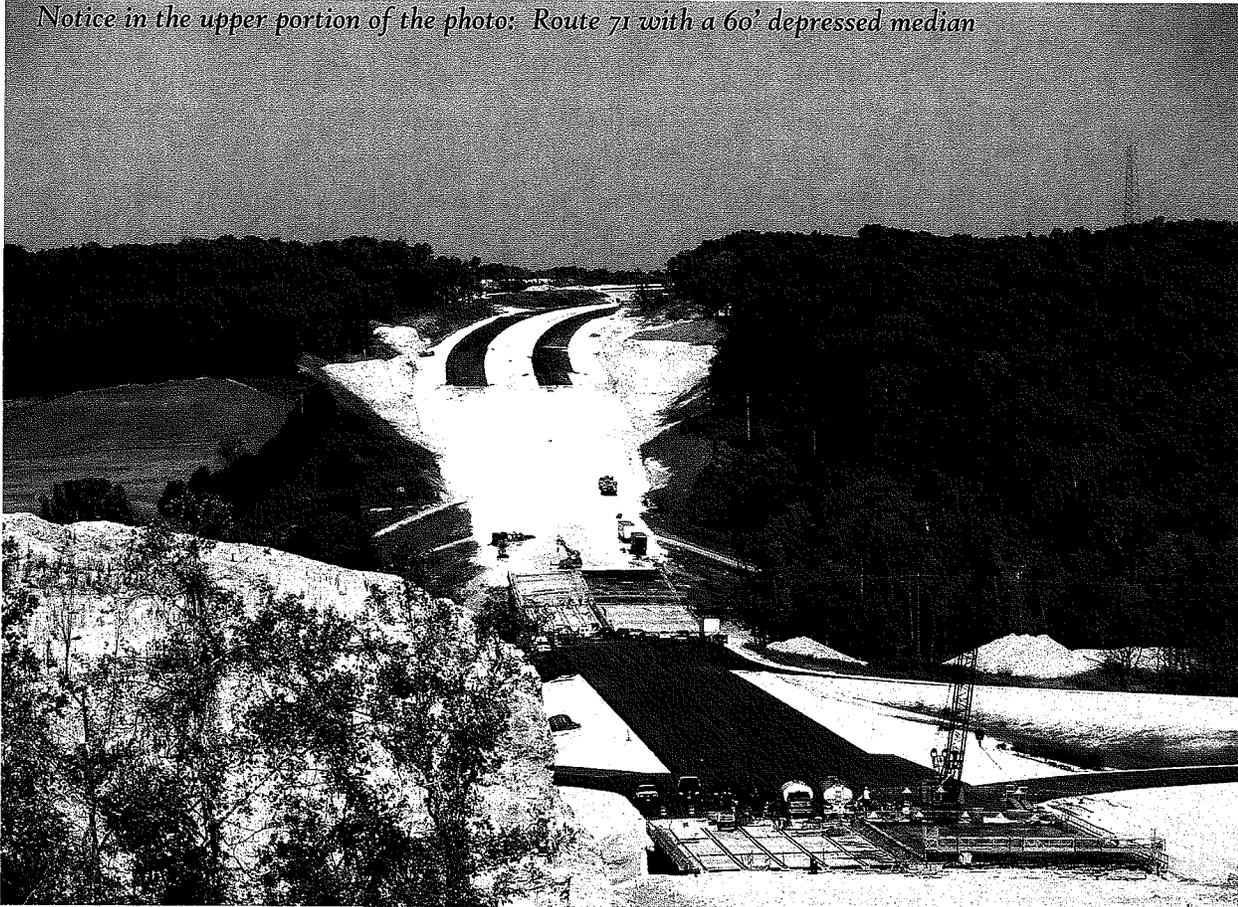


Typical Section for the majority of Route 71



Compressed Median

Notice in the upper portion of the photo: Route 71 with a 60' depressed median

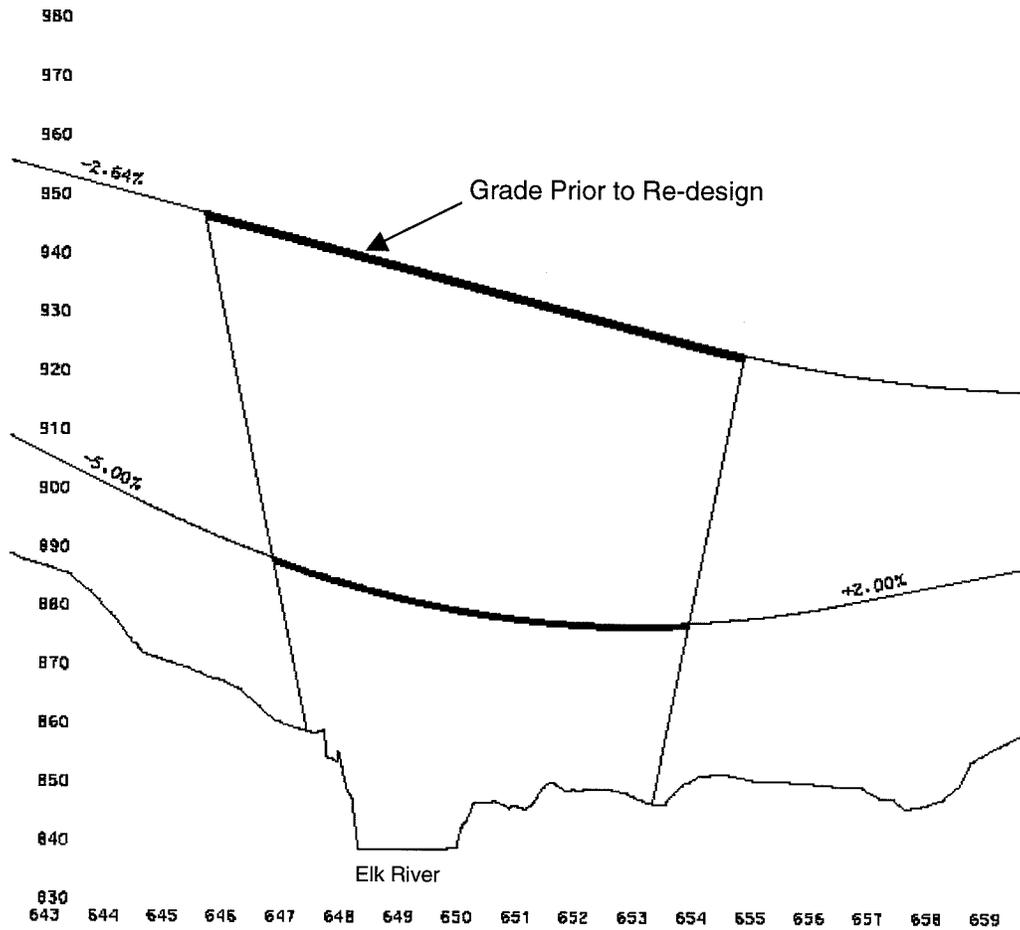


In the middle of the photo the bridges are constructed using a 14' compressed median.



By using a compressed median cuts were narrower and by using a 5% grade cuts and fills were lessened.

Profile Grade Comparison



Notice the difference in the height of the bridges.

Cost Savings

The initial cost savings from the value engineering study held in 2001 is as follows:

| | Cost prior to 2001 VE | After 2001 VE | Savings |
|------------------|------------------------|------------------------|------------------------|
| Roadway estimate | \$68,000,000.00 | \$51,195,900.00 | \$16,804,100.00 |
| Bridge estimate | \$22,627,850.00 | \$5,760,000.00 | \$16,867,850.00 |
| Totals | \$90,627,850.00 | \$56,955,900.00 | \$33,671,950.00 |

Totals include cost of paving for previous section of Route 71 (Job No. J7P0601G)

Additional Cost Savings for target cut of 10%

Reduce Pavement Thickness

Reduced asphalt from 15 inches to 12 inches on paving projects J7P0601F

| <u>Project</u> | <u>Current Programmed Cost</u> | <u>Construction Estimates Using Cost Saving Recommendations</u> |
|--------------------|--------------------------------|---|
| J7P0601C | \$ 23,996,000.00 | \$23,996,902.81 |
| J7P0601I | \$ 11,033,000.00 | \$10,275,000.00 |
| J7P0601F | \$ 7,996,000.00 | \$7,025,000.00 |
| Total => | \$ 43,025,000.00 | \$41,296,902.81 |

Note: previous total of \$56.9 million was an estimate in 2001, the estimate decreased as the Excavation numbers were changed to unclassified and other numbers became more accurate

Represents a 4.0% savings in construction cost or total dollar value of \$1.7 million.

Final Results

Award vs. Programmed difference -2.7%

| <u>Project</u> | <u>Current Programmed Cost</u> | <u>Award</u> |
|--------------------|--------------------------------|------------------------|
| J7P0601C | \$ 23,996,000.00 | \$24,908,410.27 |
| J7P0601I | \$ 11,033,000.00 | \$9,871,052.83 |
| J7P0601F | \$ 7,996,000.00 | \$7,072,240.40 |
| Total => | \$ 43,025,000.00 | \$41,851,703.50 |

Roadway User Expectations



Example of 4-lane 14' compressed median on Route 71 further south.