GBA GEORGE BUTLER ASSOCIATES, INC.

RECEIVED
FEB - 1 2007
DESIGN DIVISION
MO. DEPT OF TRANSPORTATION

Engineers • Architects
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January 31, 2007

MoDOT Design Division, ATTN: Mr. Jay Bestgen
1320 Creek Trail Drive
Jefferson City, MO 65109

Subject: 2007 Practical Design Awards for Excellence

Dear Judges:

George Butler Associates, Inc. is pleased to submit this entry for the 2007 Practical Design Awards for Excellence. GBA and MoDOT began Project J5S0500 in 2001 when practical design was just practical.

In early 2005, after the liberation provided by the MoDOT Practical Design Guidelines, the project was redesigned with a complete return to satisfying only the purpose and need, resulting in significant cost and time savings. We believe this is an exceptional example of MoDOT success because it demonstrates practicality in so many areas. Key factors for your consideration are:

A. The Right Scope – The 2001 scope was to widen the road to 32', raise the approach roadways out of the flood on an offset alignment, and span 440'of the floodplain with five 88' spans that required costly concrete piers and pile footings. A design exception was explored to reduce the design frequency to 50 years with less than normal freeboard, however the economic savings was not substantial enough to justify design exception. Even though other alternatives were studied, this alternative allowed traffic to use the old roadway during bridge construction, eliminated 'substandard' curves, and minimized environmental impacts to sensitive oxbow areas.

The 2005 design that was constructed as shown in the enclosed photos left the approach roadway at the current elevation so that the floods would continue to overtop the roadway. Crash records verified that this condition did not represent a safety problem. This allowed the bridge to be reduced to just three 40'/55'/40' spans. The new roadway was narrowed to replicate the existing roadbed. The existing alignment was maintained and the road was closed during construction. Side slopes were not flattened unnecessarily and the environmental impacts were essentially eliminated.

B. Purpose and Need - The 2005 design returned entirely to the real purpose and need, a simple bridge replacement. The old bridge was structurally deficient and functionally obsolete. Only those conditions needed to be remedied.

C. Special Design Features – An existing oxbow that was cut off by the original Route V construction was an interesting feature and the design team made it a priority from day one to protect this habitat. Initially, we considered reconnecting it to restore natural conditions, but upon further study, determined that leaving it unconnected was the best approach. Changing the flow thru it would damage the balance of the system. Instead, we chose to take advantage of the quality of the feature and enlarge it as our mitigation area for the slight impacts we had at one of the bridge ends. Permanent geotechnical fabric was used under all steep slope protection areas to battle stream meander and preserve these areas as practically as possible.

D. Cost savings - Construction cost was estimated to be $1,326,000 at the end of 2004. The 2006 Letting cost was $593,756.50. ROW costs were a small fraction of the 2001 ROW. The 2006-2010 STIP shows a construction cost of $637,000. This resulted in a construction savings of over $700,000.

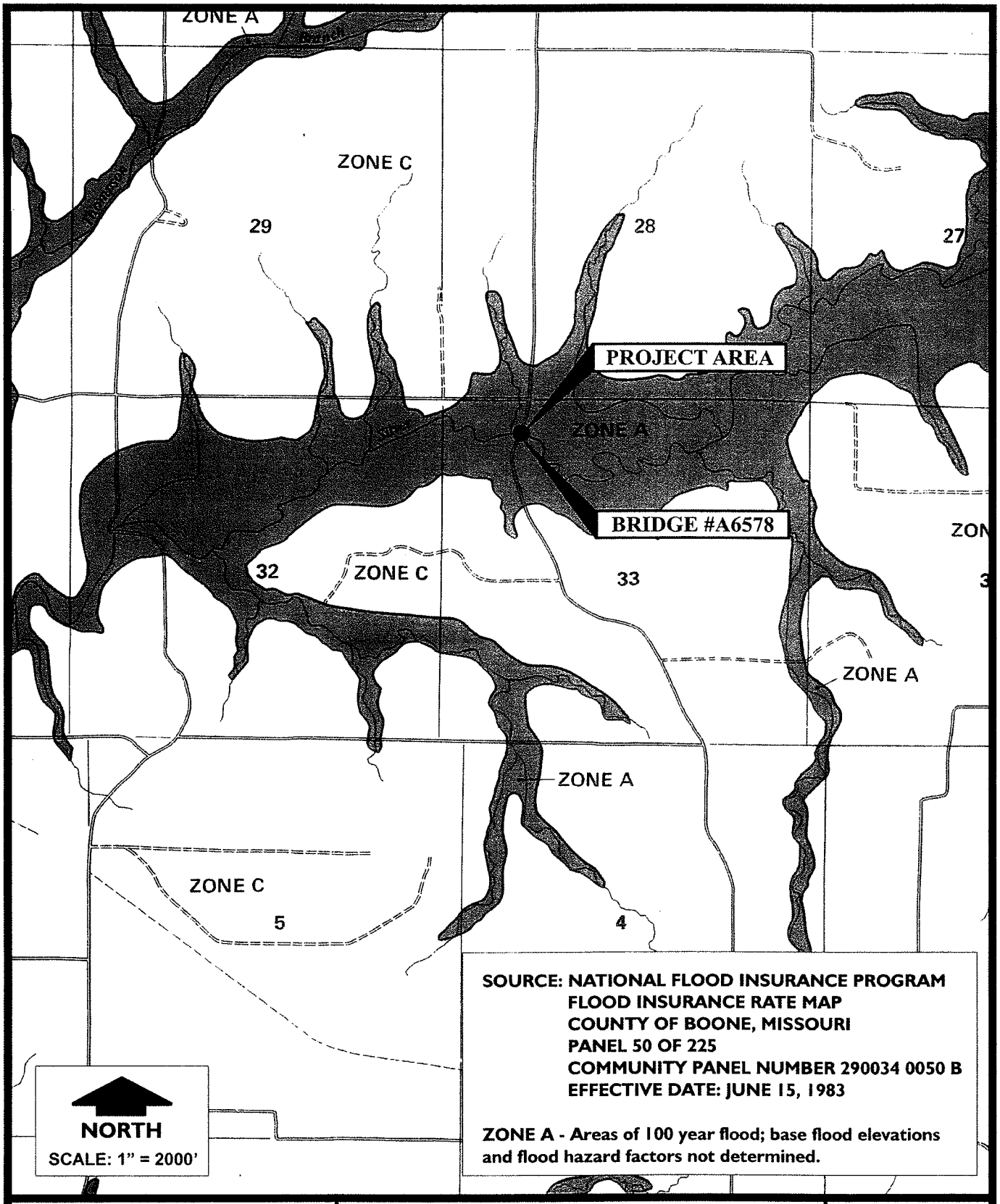
E. Roadway User expectations – The newly constructed project provides a practical roadway in terms of width, vertical and horizontal geometry, consistent with the remainder of Route V in this area of Boone County. The roadway was closed during construction in the summer to reduce inconvenience to school bus traffic. This allowed the contractor to get in and get out. The design consisted of precast concrete girders and steel pile bents that increased the speed of construction too.

We hope you will find that this project is worthy of recognition. Our team is proud of the outcome.

Sincerely,

George Butler Associates, Inc.

Timothy J. Ross
Project Manager



SOURCE: NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COUNTY OF BOONE, MISSOURI
PANEL 50 OF 225
COMMUNITY PANEL NUMBER 290034 0050 B
EFFECTIVE DATE: JUNE 15, 1983

ZONE A - Areas of 100 year flood; base flood elevations and flood hazard factors not determined.

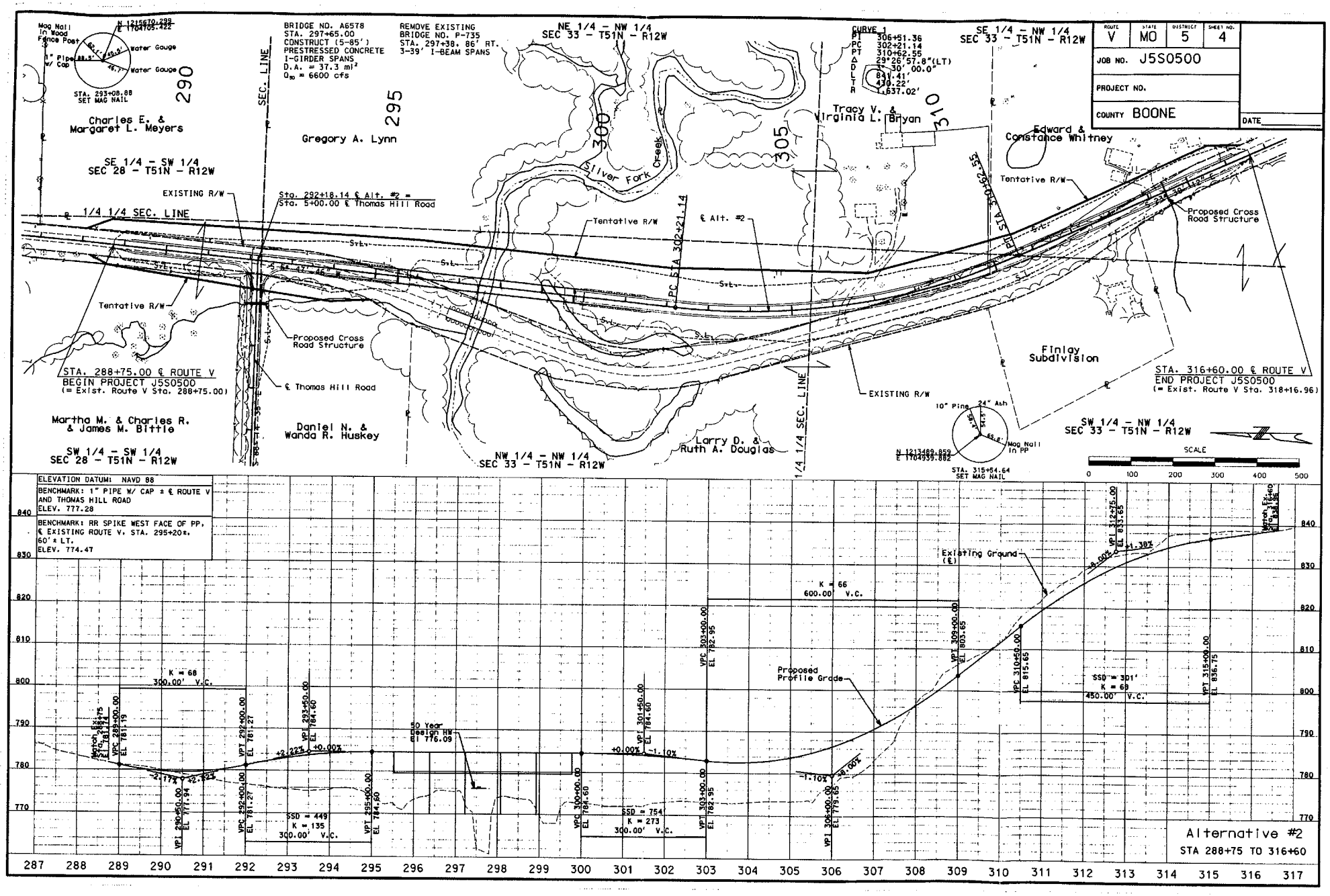
GBA GEORGE BUTLER ASSOCIATES, INC
Engineers/Architects/Landscape Architects/Planners

9581.02

FEMA MAP
BRIDGE NO. A6578, ROUTE V
MISSOURI DEPT. OF TRANSPORTATION
BOONE COUNTY, MISSOURI

DATE: 12/10/01

FIGURE: 1

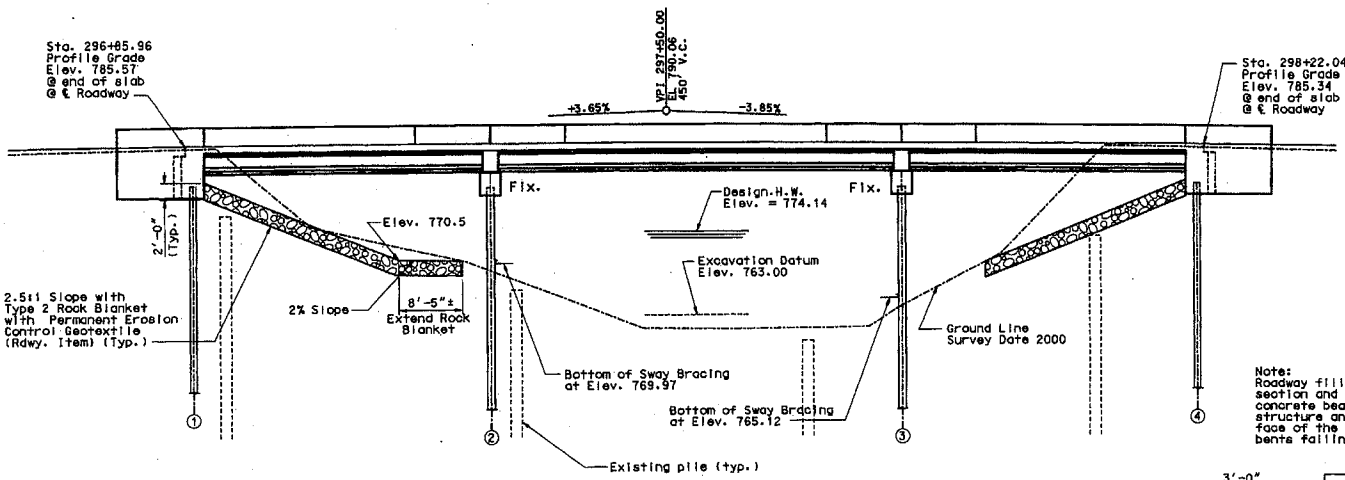


ROUTE V
STATE MO
DISTRICT 5
SHEET NO. 4
JOB NO. J5S0500
PROJECT NO.
COUNTY BOONE
DATE
BRIDGE NO. A6578
STA. 297+65.00
CONSTRUCT (5-85')
PRESTRESSED CONCRETE
I-GIRDER SPANS
D.A. = 37.3 mi²
Q50 = 6600 cfs
REMOVE EXISTING
BRIDGE NO. P-735
STA. 297+38. 86' RT.
3-39' I-BEAM SPANS
CURVE 1
PI 306+51.36
PC 302+21.14
PT 310+62.55
Δ 29°26'57.8"(LT)
D 3°30'00.0"
L 841.41'
T 430.22'
R 1,637.02'
NE 1/4 - NW 1/4
SEC 33 - T51N - R12W
SE 1/4 - NW 1/4
SEC 33 - T51N - R12W
SE 1/4 - SW 1/4
SEC 28 - T51N - R12W
SW 1/4 - SW 1/4
SEC 28 - T51N - R12W
NW 1/4 - NW 1/4
SEC 33 - T51N - R12W
SW 1/4 - NW 1/4
SEC 33 - T51N - R12W
Charles E. & Margaret L. Meyers
Gregory A. Lynn
Tracy V. & Virginia L. Bryan
Edward & Constance Whitney
Martha M. & Charles R. & James M. Bittle
Daniel N. & Wanda R. Huskey
Larry D. & Ruth A. Douglas
Finlay Subdivision
Silver Fork Creek
1/4 1/4 SEC. LINE
SEC. LINE
EXISTING R/W
Tentative R/W
Proposed Cross Road Structure
℄ Thomas Hill Road
℄ Alt. #2
PC STA 302+21.14
PT STA 310+62.55
STA. 288+75.00 ℄ ROUTE V
BEGIN PROJECT J5S0500
(= Exist. Route V Sta. 288+75.00)
STA. 316+60.00 ℄ ROUTE V
END PROJECT J5S0500
(= Exist. Route V Sta. 318+16.96)
STA. 293+08.88
SET MAG NAIL
STA. 315+54.64
SET MAG NAIL
Water Gauge
SCALE
0 100 200 300 400 500
ELEVATION DATUM: NAVD 88
BENCHMARK: 1" PIPE W/ CAP ± ℄ ROUTE V AND THOMAS HILL ROAD
ELEV. 777.28
BENCHMARK: RR SPIKE WEST FACE OF PP, ℄ EXISTING ROUTE V, STA. 295+20±, 60' ± LT.
ELEV. 774.47
Existing Ground (℄)
Proposed Profile Grade
50 Year Design HW El 776.09
K = 68 300.00' V.C.
K = 66 600.00' V.C.
SSD = 449 K = 135 300.00' V.C.
SSD = 754 K = 273 300.00' V.C.
SSD = 301' K = 69 450.00' V.C.
Alternative #2
STA 288+75 TO 316+60

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

(40' - 55' - 40') Prestressed Concrete I-Girder Spans

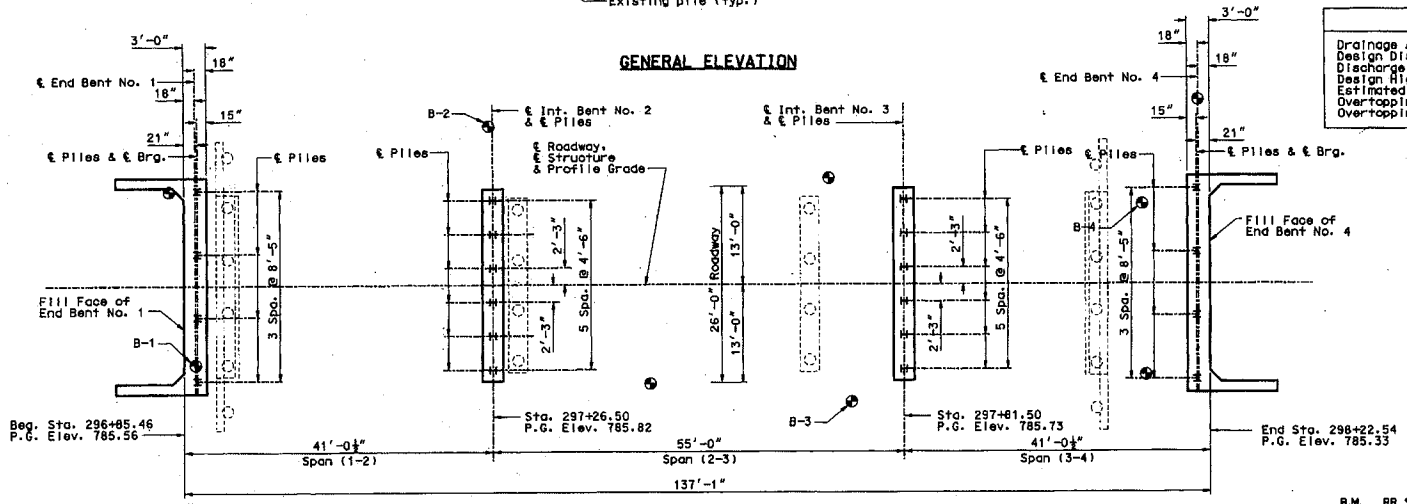
STATE	PROJ. NO.	SHEET NO.
MO.		
SEC./SUR. 33	TWP. 51N	RGE. 12W



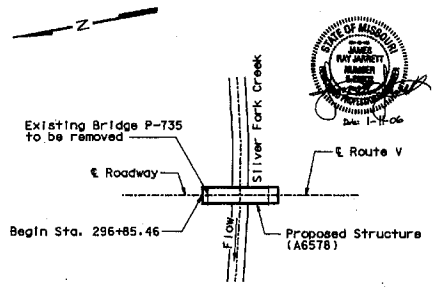
Note:
Roadway fill shall be completed to the final roadway section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25' in back of the fill face of the end bents before piles are driven for any bents falling within the embankment section.

GENERAL ELEVATION

HYDROLOGIC DATA		
Drainage Area	=	37.3 sq. mi. (Hilly)
Design Discharge, Q10	=	4200 cfs
Discharge, Q100	=	7700 cfs
Design Highwater Elev.	=	774.14
Estimated Backwater	=	0.67 ft.
Overtopping Discharge	=	4375 cfs
Overtopping Frequency	=	12 yrs.



PLAN



LOCATION SKETCH

B.M. RR Spike West face of PP, Existing ℄ Route V, Sta. 295± ±60' LT. Elev. 774.47

Note:

⊕ Indicates location of borings.

All longitudinal dimensions are horizontal.

For General Notes, Estimated Quantities and Pile Data, see Sheet No. 2.

For Boring Data, see Sheet No. 3.

NOTICE AND DISCLAIMER REGARDING BORING LOG DATA

The locations of all subsurface borings for this structure are shown on the bridge plan sheet for this structure. Boring data for the numbered locations is shown on sheet no.3. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, is available from the Project Contact upon written request as outlined in the Project Special Provisions. No greater significance or weight should be given to the boring data depicted on the plan sheets than is subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

DESIGNED	June	2005
DETAILED	June	2005
CHECKED	July	2005

GBA GEORGE BUTLER ASSOCIATES, INC. Engineers • Architects

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 22

BRIDGE: ROUTE V OVER SILVER FORK CREEK

STATE ROAD FROM ROUTE CC TO ROUTE U

ABOUT 3 MILES SOUTH OF ROUTE CC

PROJECT NO. **STA.** 296+85.46

JOB NO. J5S0500 **RTE.** V

BOONE COUNTY

DATE

STD. 617.10
STD. 706.35
A6578

K:\#9581\Rte_...ge Redesign\J5S0500_001GE&P_D.dgn
1/11/2006
1:32:44 PM
MFENLON

ROUTE	STATE	DISTRICT	SHEET NO.
V	MO	5	3

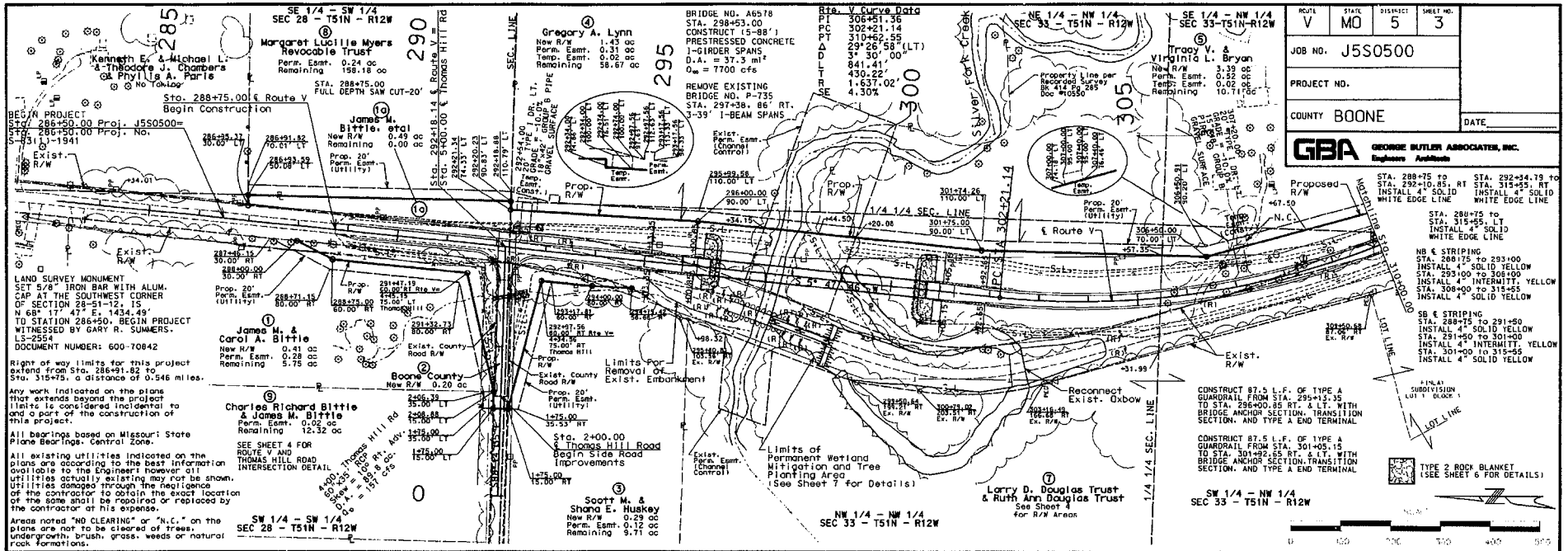
JOB NO. J5S0500

PROJECT NO.

COUNTY BOONE

DATE

GBA GEORGE BUTLER ASSOCIATES, INC. Engineers Architects



ELEVATION DATUM: NAVD 88

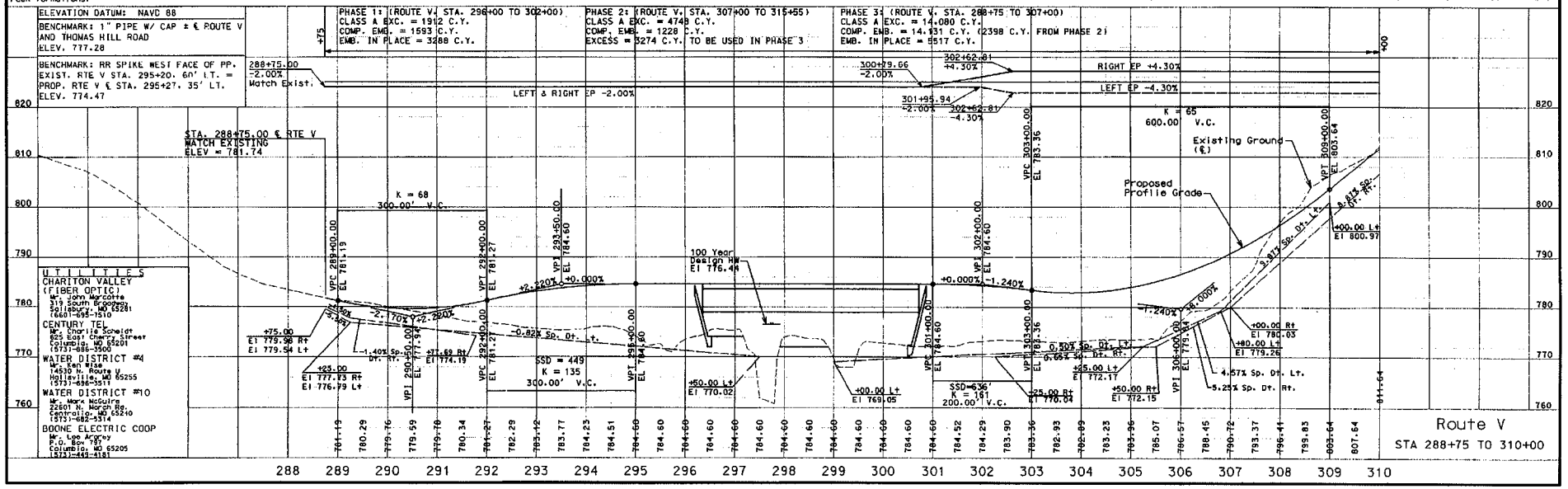
BENCHMARK: 1" PIPE W/ CAP ± ℄ ROUTE V AND THOMAS HILL ROAD ELEV. 777.28

BENCHMARK: RR SPIKE WEST FACE OF PP. EXIST. RTE V STA. 295+20. 60' LT. = PROP. RTE V ℄ STA. 295+27. 35' LT. ELEV. 774.47

PHASE 1: (ROUTE V, STA. 296+00 TO 302+00)
CLASS A EXC. = 1912 C.Y.
COMP. EMB. = 1593 C.Y.
EMB. IN PLACE = 3288 C.Y.

PHASE 2: (ROUTE V, STA. 307+00 TO 315+55)
CLASS A EXC. = 4749 C.Y.
COMP. EMB. = 1228 C.Y.
EXCESS = 3274 C.Y. TO BE USED IN PHASE 3

PHASE 3: (ROUTE V, STA. 288+75 TO 307+00)
CLASS A EXC. = 14,080 C.Y.
COMP. EMB. = 14,131 C.Y. (2398 C.Y. FROM PHASE 2)
EMB. IN PLACE = 8517 C.Y.



UTILITIES

CHARITON VALLEY (FIBER OPTIC)
Mr. John Marcotte
319 South Broadway
Salisbury, MO 65281
(660)-695-7510

CENTURY TEL
Mr. Charlie Scheidt
825 East Chestnut Street
Columbia, MO 65201
(573)-886-3500

WATER DISTRICT #4
Mr. Ken Rise
14530 N. Route V
Hallsville, MO 65255
(573)-696-3511

WATER DISTRICT #10
Mr. Mark McGuire
22601 N. Morgan Rd.
Centralia, MO 65240
(573)-682-5314

BOONE ELECTRIC COOP
Mr. Leo Argeroy
P.O. Box 797
Columbia, MO 65205
(573)-443-4181

8/31/05

ROUTE	STATE	DISTRICT	SHEET NO.
V	MO	5	3

JOB NO. J5S0500

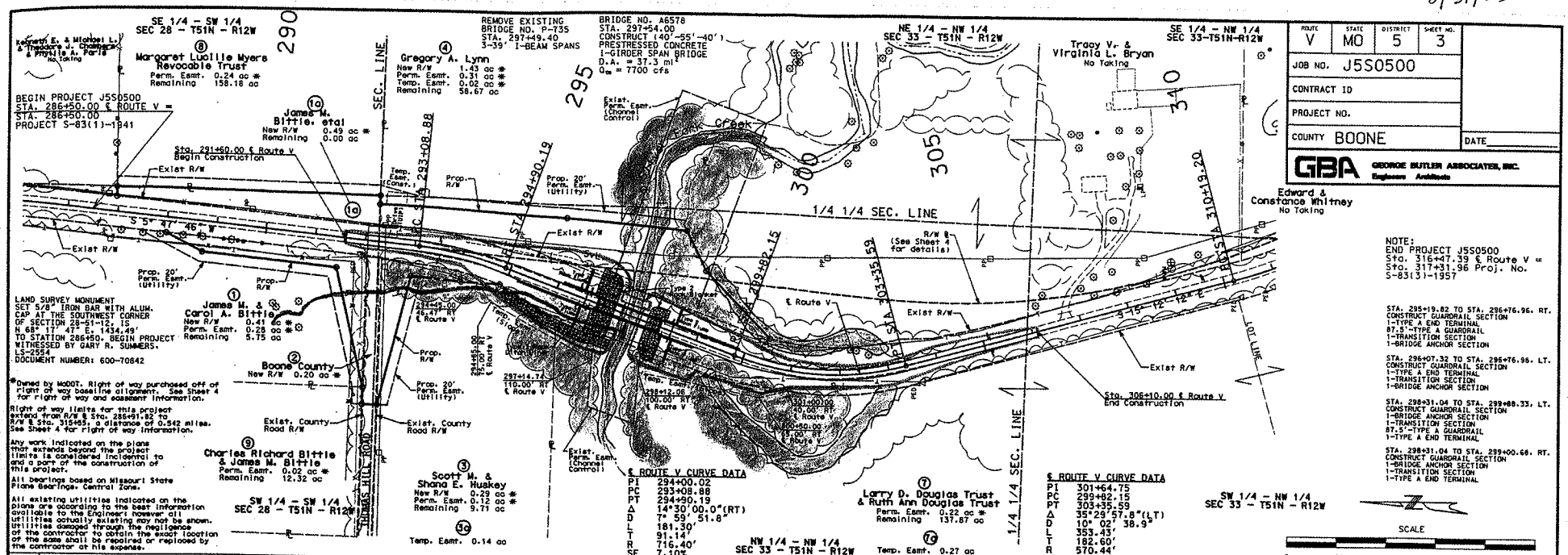
CONTRACT ID

PROJECT NO.

COUNTY BOONE

DATE

GBA GEORGE BUTLER ASSOCIATES, INC. Engineers Architects



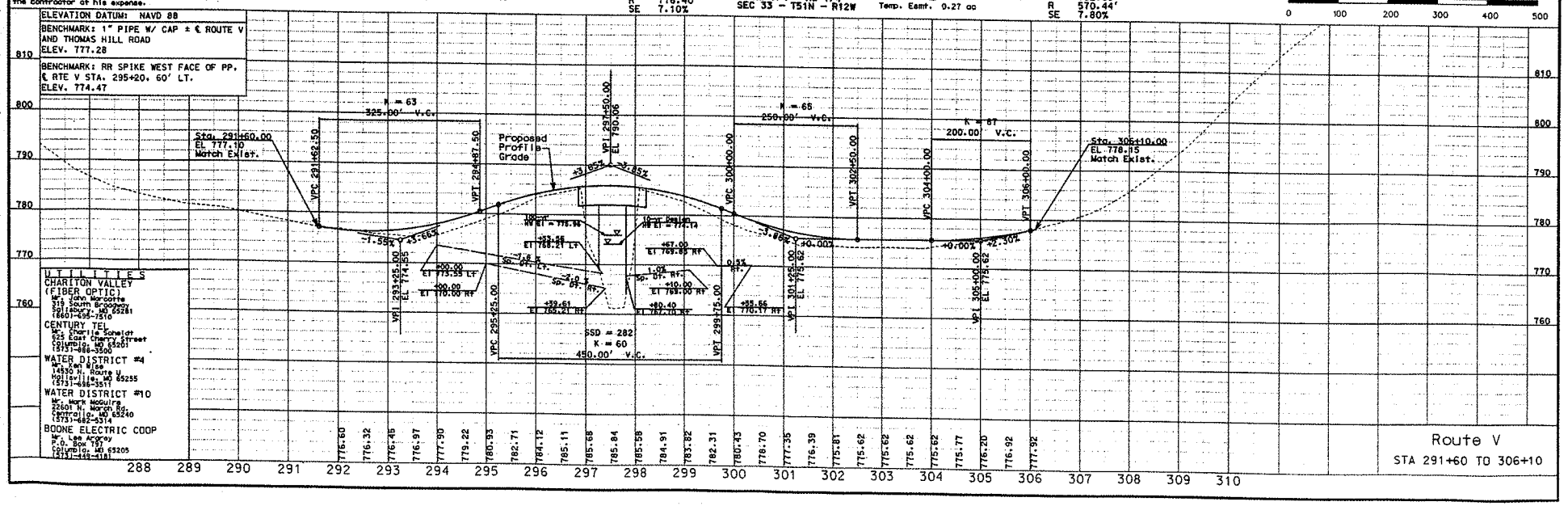
NOTE:
END PROJECT J5S0500
Sta. 316+47.39 ℄ Route V =
Sta. 317+31.96 Proj. No.
S-83(3)-1957

STA. 295+19.82 TO STA. 296+76.96. RT.
CONSTRUCT GUARDRAIL SECTION
1-TYPE A END TERMINAL
87.5'-TYPE A GUARDRAIL
1-TRANSITION SECTION
1-BRIDGE ANCHOR SECTION

STA. 295+07.32 TO STA. 296+76.96. LT.
CONSTRUCT GUARDRAIL SECTION
1-TYPE A END TERMINAL
1-TRANSITION SECTION
1-BRIDGE ANCHOR SECTION

STA. 298+31.04 TO STA. 299+88.33. LT.
CONSTRUCT GUARDRAIL SECTION
1-BRIDGE ANCHOR SECTION
1-TRANSITION SECTION
87.5'-TYPE A GUARDRAIL
1-TYPE A END TERMINAL

STA. 298+31.04 TO STA. 299+00.66. RT.
CONSTRUCT GUARDRAIL SECTION
1-BRIDGE ANCHOR SECTION
1-TRANSITION SECTION
1-TYPE A END TERMINAL



2007 APPLICATION FORM

(required for each entry)

Job No. J5S0500 **Route** V **County** Boone

STIP Description (Scoping or Construction, state which STIP) 05-09 ☐ 06-10 ☒ 07-11 ☐

Grading, pave two lanes and build two-lane bridge over Silver Fork Creek 3.1 miles south of Rte. CC. Project involves bridge P-735.

Project Manager (could have both)

MoDOT Kenny Voss **Consultant** Tim Ross

Active core team members as approved by the MoDOT PM (may include consultants)

Kenny Voss, Charles Sullivan, Tim Ross, Greg Sunde, Melissa Scheperle, Cory Clark, Randy Potts, Jim Jarrett, Bruce Green, Roger Wolfe

Project Contacts (will have both for consultant entry)

District Kenny Voss **Consultant $** Tim Ross

STIP budget $ or **Award cost** $ 593,756.50

Value Engineering study during design? yes ☐ no ☐ (if yes) **Project Stage**

VE Contact person Glenn Rice

Construction-stage VE (VECP)? yes ☐ no ☐ (if yes) **Explain**

Total VECP savings $ **VECP Contact Person**

Why is this entry the "poster" image for MoDOT's practical design philosophy?

(In layman's terms - 100 words or fewer - attach additional sheet if necessary) "The project was originally a bridge replacement on full relocation. After re-scoping and looking for additional savings, the project was changed to replace the bridge on the existing alignment and close the route during construction. In addition, the bridge was redesigned by design exception based on a 10-year flood, since alternate routes that do not flood are nearby. The resulting project reflects a savings of approximately $1 million dollars over the original scope and delivers the intended purpose and need. "-Bruce Green

Send entries to: MoDOT Design Division, ATTN: Jay Bestgen
1320 Creek Trail Dr.
Jefferson City, Missouri 65109

All entries must be received no later than close of business on February 1, 2007