

2007 APPLICATION FORM

(required for each entry)

Job No. J6P0876E & J6P0876I

Route 21

County Jefferson

STIP Description (Scoping or Construction, state which STIP)

05-09

06-10

07-11

Scoping

Roadway Realignment, Grading, Paving, Drainage, and 4 new bridges from 0.3 miles north of Lake Lorraine Road to Hayden Road.

Project Manager (could have both)

MoDOT John Smith (MoDOT/HNTB - PM)

Consultant Mansour Mansouri (Horner & Shifrin, Inc.)

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

John Smith (HNTB)

Jim Smith (MoDOT DLE)

Joyce Foster (MoDOT Bridge)

John Grana (MoDOT RE)

Ken Bequette (MoDOT Maint.)

Phil Ruffus (MoDOT Geotechnical)

Judy Wagner (MoDOT A.E.)

Bill Mclaughkin (MoDOT Des.)

Mansour Mansouri (Horner & Shifrin)

Shirley Norris (MoDOT PM)

Bree McMurry (MoDOT Env.)

Jarrett Jasper (Horner & Shifrin)

Project Contacts (will have both for consultant entry)

District John Smith (HNTB), Mansouri (H&S)

Consultant \$ _____

STIP budget \$34,650,000

or Award cost \$ _____

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

VE Contact person Mansour Mansouri (Horner & Shifrin, Inc.)

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 Route 21 Redesign embraces the tenets of the Practical Design philosophy. Horner & Shifrin's redesign included innovative methods of construction as well as non-traditional design. Design innovations such as elimination of the open median and using median barriers aids stormwater drainage while substantially reducing earthwork. We also employed a non-traditional design method by replacing one of the ramps at the diamond interchange with a folded ramp which eliminated 0.6 million cubic yards of fill and one box culvert and substantially reduced the length of another box culvert.

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



HORNER & SHIFRIN, INC.

5200 OAKLAND AVENUE • SAINT LOUIS, MISSOURI 63110
314-531-4321 • FAX 314-531-6966
www.hornershifrin.com

ENGINEERS
ARCHITECTS
PLANNERS

January 31, 2007

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

Re: Practical Design 2007 Awards for Excellence
Horner & Shifrin Entry: Route 21 Redesign

Dear Mr. Bestgen:

Thank you for the opportunity to participate in the Practical Design 2007 Awards for Excellence Competition. To aid in your review, we have structured our response to parallel the sections in your Ratings Guidelines.

A. Project Scope

In December of 2000, Horner & Shifrin was awarded the contract by MoDOT to design the new Route 21 from Lake Lorraine to immediately south of Hayden Road. The project involved the design and preparation of construction documents for 3.6 miles of new four-lane divided highway, three bridges, two interchanges, outer roads, and numerous box culverts. The original design was based on the previously completed preliminary plan prepared by MoDOT and its Program Manager, HNTB. The design project was successfully completed and submitted to MoDOT with an estimated construction cost of \$32,000,000. However, due to lack of funding, the project was shelved pending availability of construction funds. The scope remained the same during the Practical Design application.

B. Purpose and Need

After the passage of Proposition "B," the project was funded and earmarked for construction letting in April of 2007. Meanwhile, due to the new cost saving/practical design initiative by MoDOT, Horner & Shifrin proposed and was put to the challenge by MoDOT, to conduct a study and determine possible design revisions that could result in construction savings. The study was completed in July 2006, and a report was prepared outlining and recommending several design revisions that would result in approximately \$5,000,000 (or 16%) savings in the total construction cost of the project.

After review of the report outlining the cost saving measures, in August of 2006 MoDOT decided to have Horner & Shifrin implement all of the recommended revisions which would require the redesign of approximately 75% of the project. However, MoDOT indicated that the previously scheduled construction letting date of April 2007 could not be delayed, and therefore needed to be maintained. Understanding the lengthy proposal negotiation and the change order process necessary to initiate the work, Horner & Shifrin concluded that in order to meet the April 2007 deadline, the redesign had to commence immediately and could not wait for the execution of the change order. Therefore, an executive decision was made to proceed with the redesign of the project without a contract.

On January 19, 2007, Horner & Shifrin met MoDOT's deadline by submitting the 100% completed unsealed, unsigned construction plans for final review by the core team members. Horner & Shifrin is proud to have been able to redesign this project in less than six months and to be instrumental in MoDOT's practical design initiative.



C. New Techniques, Methods and Non-Traditional Design

- One innovative method of construction was to redesign the Route 21 typical section as shown in Figure 1. Instead of crowning the southbound and northbound lanes and draining water toward the median, the typical section was changed so that the crown was located at the center of the four lanes. This reduced the need for median drainage and was another cost saving measure.
- The redesign is non-traditional because one of the ramps at the diamond interchange at Existing Route 21 was replaced with a folded ramp. Practical design was implemented for the design of this specially designed ramp. Figure 2 shows the cost saving design and original design for Ramp 3 at the Existing Route 21 interchange.

D. Cost Savings

Document cost savings between STIP budget and actual project award cost.

STIP budget: \$34,650,000

Practical Design Savings amounted to \$5,000,000 (16%) savings in the total construction cost of the project.

Cost saving measures included:

- Conversion of a diamond interchange to a folded back interchange which resulted in the elimination of 0.6 million cubic yards of fill, elimination of one box culvert and substantial reduction in length of another box culvert.
- Elimination of open median and inclusion of median barriers which resulted in substantial reduction of earthwork, lengths of box culverts, and bridge length.
- Revision of main line profile to reduce benching, rock cut quantities, and embankment. The profile revision eliminated the need to modify the benching, which was originally necessary to balance the earthwork for the project. Over 0.7 million cubic yards of modified benching were eliminated.

E. Roadway User Expectations

The redesign does not minimize traffic delays. However, the design does speed the overall construction time and lessens the impacts to the traveling public. The project will take less time to build, since much of the earthwork has been removed.

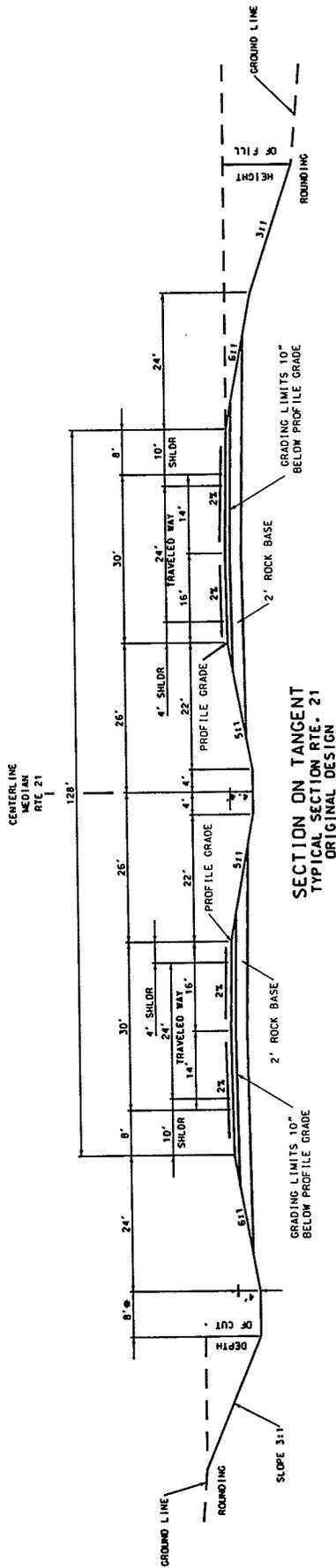
The design provides a consistent roadway between the logical termini. The typical section which was modified from the original design is the same between the two interchanges which book-end the project.

The design did not unnecessarily go beyond "Purpose and Need." The goal of the redesign was to reduce as much cost as possible. Every major part of the project was evaluated to see if costs could be lowered.

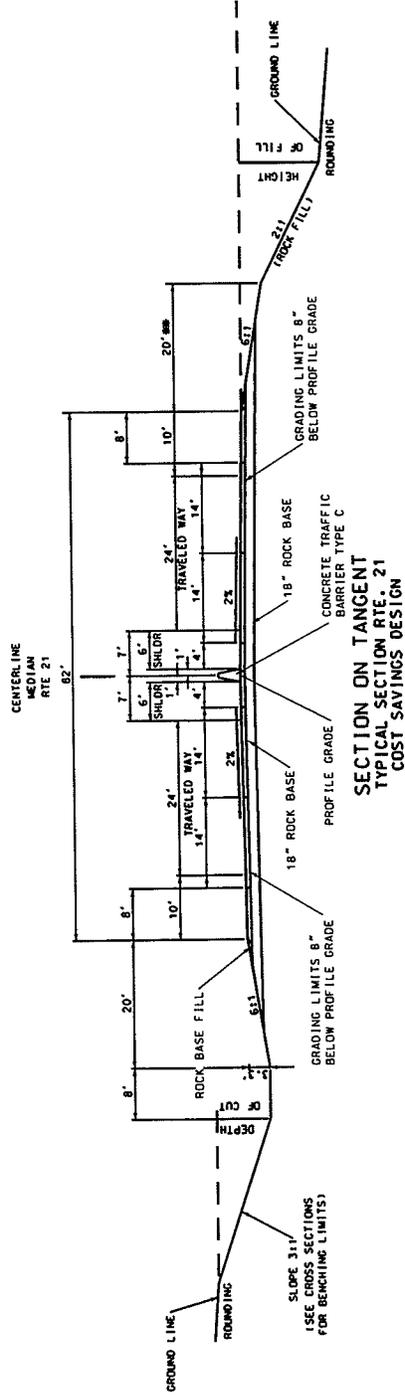
Once again, thank you for this opportunity. Horner & Shifrin is proud to have played a significant role in MoDOT's Practical Design Initiative.

Respectfully Submitted,

A. Mansour Mansouri, P.E.
Vice President
Director, Transportation/Civil Engineering



SECTION ON TANGENT
TYPICAL SECTION RTE. 21
ORIGINAL DESIGN



SECTION ON TANGENT
TYPICAL SECTION RTE. 21
COST SAVINGS DESIGN

FIGURE 1. ROUTE 21 TYPICAL SECTION CHANGES

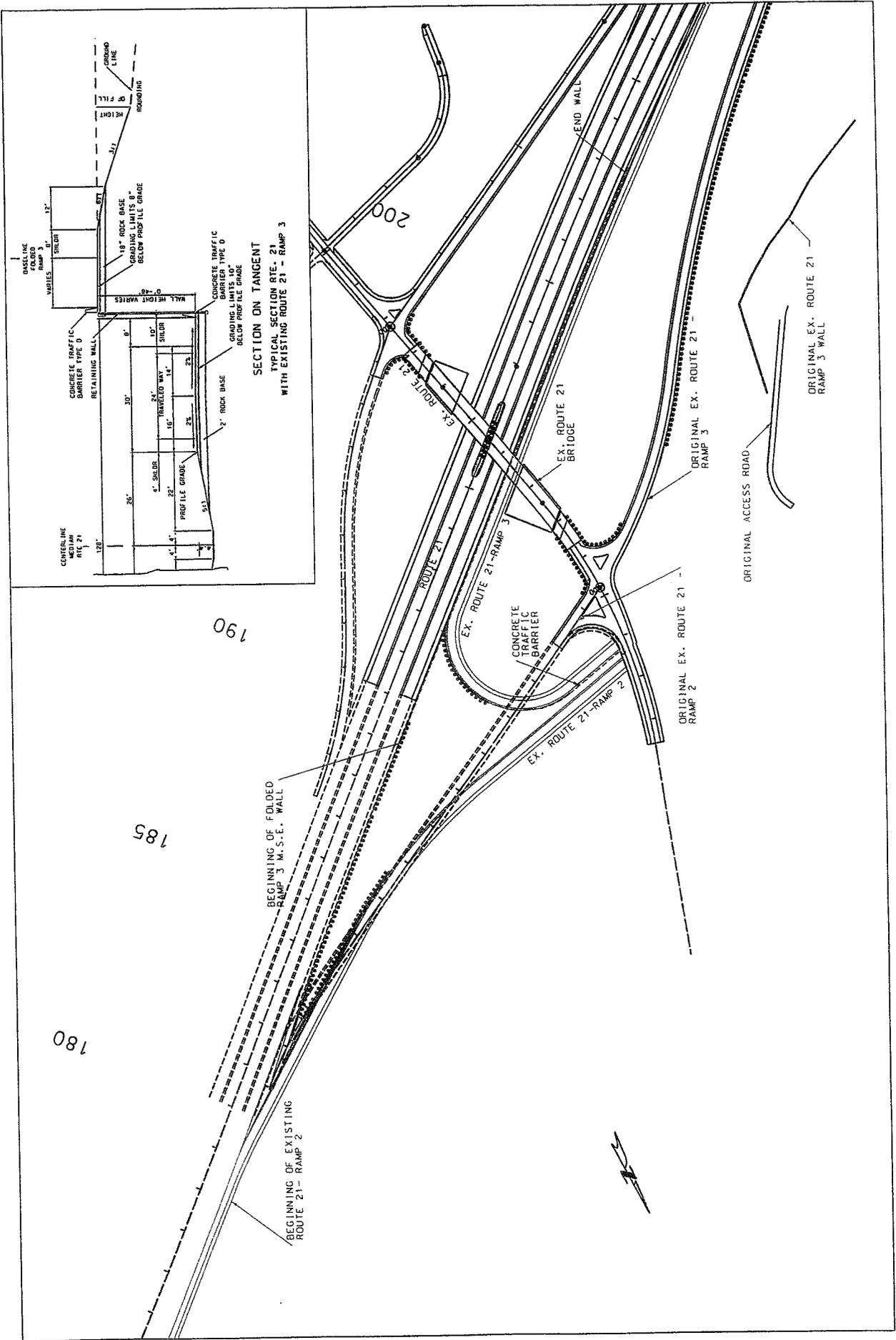


FIGURE 2. EXISTING ROUTE 21 - RAMPS 2 & 3 PLAN