Form C-104
Rev. 09/2008

VALUE ENGINEERING CHANGE PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date 11/12/2008

Contract ID 080919-401 Job No. J4I1650

County Jackson Original Bid Cost $14,338,653.91

Contractor Emery Sapp & Sons, Inc. By Jesse Hinton

Designed By Bartlett & West Phone 573-445-8331

VECP# 08-99 (to be completed by C.O.) VECP ☒ or VECP/PDU ☐

1. **Description of existing requirements and proposed change(s). Advantages/Disadvantages**
   The project consists of constructing two identical two-span bridges (A7503 & A7504). Emery Sapp & Sons proposes to design and construct both bridges as single-span structures. The structures would be approximately 128 ft in length with MSE walls at the abutments. This proposal will provide more aesthetically pleasing structures by eliminating the interior bents and the rock blanketed slopes. Construction costs will decrease due to the shorter slab lengths and elimination of interior bents.

2. **Estimate of reduction in construction costs.** $169,210.45

3. **Prediction of any effects the proposed change(s) will have on other department costs, such as maintenance and operations.**
   None.

4. **Anticipated date for submittal of detailed change(s) of items required by Section 104.6 of the Specifications.**

   _____
   (date)

5. **Deadline for issuing a change order to obtain maximum cost reduction, noting the effect of contract completion time or delivery schedule.**

   11/26/2008 _____
   (date) (effect)

6. **Dates of any previous or concurrent submission of the same proposal.**

   _____
   (date and/or dates)

Additional Comments:

**** Portion Below This Line To Be Filled Out by MoDOT ****

Comments:
I do not recommend approval of this VE Proposal based on conversations and recommendations made by the Design Team and the City of Lee's Summit. See attached feedback from Project Manager, Allan Ludiker, P.E. The consultant designer is also providing additional feedback for MoDOT's records and consideration and it will be available if requested. Ron Temme, P.E., does not support this change and could provide MoDOT's bridge prespective. The Design Team did consider this option during the bridge selection process, but felt the disadvantages outweighed the advantages.

Shelli Daniel — Submitted By Resident Engineer — 10-24-08 — Date

Comments: WE CONCUR WITH FINDINGS OF THE RESIDENT ENGINEER

☐ **Approval Recommended**
☒ **Rejection Recommended**

Elizabeth A. Hyatt (PTN) — District Engineer — 11-19-08 — Date

Comments:

☐ **Approval Recommended**
☐ **Rejection Recommended**

Federal Highway Administration
Required for FHWA Full Oversight Projects

Date

Comments: CONCEPTUAL APPROVAL IS DENIED FOR REASONS STATED IN DISTRICT'S SUPPORTING DOCUMENTATION. PROPOSAL WAS CONSIDERED BY PROJECT TEAM DURING DESIGN.

☐ **Approval**
☑ **Rejection**

David D. Gower by JSG — State Construction and Materials Engineer — 12-2-08 — Date

Distribution: Resident Engineer, Project Manager, District Construction & Materials Engineer, State Construction & Materials Engineer, Value Engineering Administrator – MoDOT, P. O. Box 270, Jefferson City, MO 65102

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October 20, 2008

Mrs. Shelie Daniel, R.E.
Missouri Department of Transportation
5101 NW Gateway
Riverside, MO 64150

RE: Value Engineering Concept #2
Rte. I-470, Jackson County,
Job No. J4I1650

Mrs. Daniel:

This letter is to inform you that Emery Sapp & Sons would like to submit a Value Engineering Change Proposal involving re-designing Bridges A7503 & A7504 to single-span NU Girder structures instead of the two-span Bulb-Tee structures in the current design. The primary benefits to this proposal would be improved aesthetics and decreased construction costs.

Anticipated Savings of VE Proposal Concept: $169,210.45

Notes to this Concept:

1. Type of proposed structures: Prestressed Concrete NU Girders (128 FT)
2. Add MSE Walls (6880 SF) at abutments
3. Eliminate interior bents
4. Decrease quantity of slab concrete and steel
5. Eliminate Type 2 Rock Blanket
6. Decrease quantity of Permanent Erosion Control Geotextile and Perforated Drain Pipe
7. Decrease length of Type S Concrete Curb

We believe that this concept includes numerous advantages – including cost savings – that will benefit MoDOT and the traveling public. If you have any questions, please contact me at (573) 445-8331. Thank you for your consideration of this proposal concept.

Sincerely,

Emery Sapp & Sons, Inc.

Jesse Hinton, EI
Project Manager

Shelie A Daniel/D4/MODOT
10/27/2008 07:20 AM

To Perry J Allen/D4/MODOT@MODOT, Dennis G Bryant/SC/MODOT@MODOT, kevin.irving@fhwa.dot.gov
cc
bcc
Subject Fw: Strother Rd - Responses to VE Proposal #2 - Bridge

Here is some additional information from the Design Team.

Shelie Daniel, P.E.
Resident Engineer
5101 NW Gateway
Riverside, MO 64150
(816) 741-7030
(816) 215-7275 (cell)
(816) 741-0200 (fax)
----- Forwarded by Shelie A Daniel/D4/MODOT on 10/27/2008 07:19 AM -----

"Herb Bailey" <herb.bailey@bartwest.com>
10/24/2008 03:19 PM

To <Shelie.Daniel@modot.mo.gov>, <Robert.Ruffini@modot.mo.gov>
cc <Allan.Ludiker@modot.mo.gov>, <Robert.Netterville@lees-summit.mo.us>, "Dena Mezger" <Dena.Mezger@lees-summit.mo.us>, "John Hobelman" <john.hobelman@BARTWEST.COM>, <Bradley.Brunk@modot.mo.gov>, "Joe Caldwell" <joe.caldwell@BARTWEST.COM>, "Bruce Hattig" <bruce.hattig@BARTWEST.COM>, <Ronald.Temme@modot.mo.gov>
Subject Strother Rd - Responses to VE Proposal #2 - Bridge

Shelie,

Attached are accumulated responses to your questions that were submitted to Allan Ludiker on October 20, 2008, with regard to Emery Sapp's Value Engineering Proposal No. 2 (Bridge). These attached comments were assembled by John Hobelman, lead designer of the roadway portion of the project and include recent comments on the value engineering proposal by Ron Temme, MoDOT structural project manager for the Strother Road bridges. The four alternates with illustrations, costs and a list of advantages and disadvantages was assembled by Chris Criswell, lead bridge designer, and attached (see StrotherProCons).

Some additional comments:

Attached you will see some of the work that was documented with costs and a list of advantages/disadvantages. During preliminary alternate study, the bridge type was discussed at some length including the cheapest alternate, the MSE wall with the single span. It is very compelling to use this alternate when only considering price. However, the two span bridge, while only slightly higher (5%) offers clear advantages to MoDOT (for future widening an inside lane and turning I-470 into a 6 lane roadway)

and to the City (for future widening of Strother Road with no bridge adjustment). Other alternates were studied as shown above in StrotherProCons.

Widening the MSE wall bridge was a factor. MoDOT made a determination that if an MSE wall was to be installed, they would like the piling for the inside lane adjustment cased and driven during construction and left in the median for future 6 laning of I-470. To do this on both inside lanes would leave little room between the walls, and so making the wall continuous between the bridges (thru the median) was considered. When considering these extra costs, the cost of the MSE wall and the two-span selection became very similar.

Drainage for the bridge was a key element in the decision making. On the two span bridge that was selected, a rock blanket is laid out on the spill slope for bridge drainholes. On the MSE wall, drainage has to be kept in a sophisticated piping system and kept unclogged. Most of these drainage systems have to undergo major maintenance due to salt use during wintertime and corrosion is a major factor.

Sight Distance for the turning movement for NW exit ramp was going to encroach on the MSE wall due to the tight nature of the alignment along the west side. There would have been a cost associated with making modifications to the wall to stay outside the sight distance line.

Maintenance of wall units that get damaged in accidents was mentioned. These interlocking wall units are not easy to replace because they have to be strapped from behind and interlock with the adjacent piece. They work fine for streams and railroad crossings and in places that can be far enough outside the clear zone. If they get hit in a congested area, they are costly to replace. Also, these would have been decorative. Matching the form lining and concrete color is always a problem.

So my interpretation of the core team was that for about the same price, the advantages of the two-span bridge was more attractive.

Herb Bailey, P.E.

Bartlett & West, Inc.

Project Manager

TEL 785-749-9452

FAX 785-749-5961

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email: herb.bailey@bartwest.com

Comments to Value Engineering Change #2 (2).doc

StrotherProCons.pdf

Comments to Value Engineering Change #2
Rte. I-470, Jackson County
Job No. J4I1650

Mrs. Shelie Daniel, R.E.
Missouri Department of Transportation
5101 NW Gateway
Riverside MO 64150

Redesign bridges A7503 and A7504 to single-span NU Girder.

I know this proposal was one of ideas discussed during plan development, how/why was the current design selected?
Are there any reasons why we would not want the proposed bridge design?
The contractor has hired Harrington and Cortelyou to VE the bridge and wall designs.

Comments from Ronald C Temme

1) It was my understanding that I-470 is likely to be widened sometime in the future. This was one factor in the decision to use a two span bridge arrangement. To accommodate the future widening of these bridges, the piling needed for the bridge widening should be installed during the original construction of the MSE walls and bridges. Piles cannot be driven thru the MSE wall reinforcing at some later time. To locate the position for these piles for the future widening the contractor will need to know the proposed future cross-section for I-470.

2) Gutters behind the walls will be needed to handle drainage from the median area. We would not want the drainage, which would contain chlorides off the roadways, to flow against or over the walls.

3) The proposed single span with MSE walls prevents future lanes on Strother Road in the future. The spill slopes of the current design could be cut back and walls installed if future expansion of Strother Road is needed. The City can comment on that probability.

4) There are constructability issues if the contractor plans on constructing the walls in stages. We have had several problems in the past (Rte 152 over Ambasador and Rte 24) where the backfill material for the end panels of the first stage was lost from around the soil reinforcement before the second stage was constructed. This caused panels to move out of alignment. Stabilizing the backfill is necessary by some method.

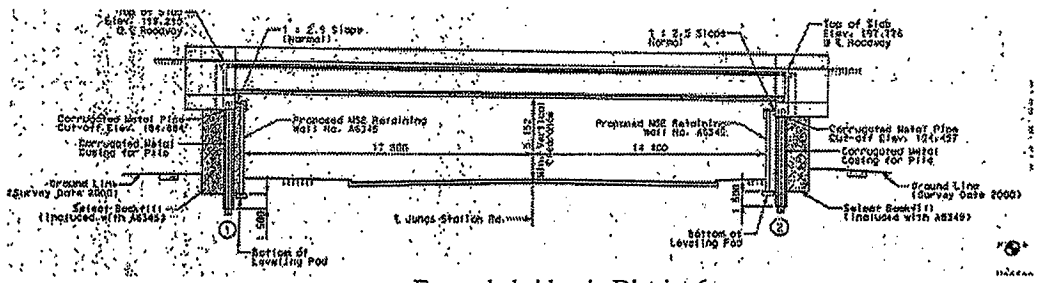
5) The MSE Walls would have to be Large Block. Small block walls would not be acceptable for this application.

Strother Road Interchange Project
MoDOT Job No. J4I1650
Bridge alternates for I-470 over Strother Road

SINGLE SPAN CONCRETE BRIDGES WITH MSE WALLS

Roadway Details (N to S): 6' sidewalk, 3' buffer, 2' curb & gutter (C&G), 4-11' lanes, 2' C&G, 4' raised median, 2' C&G, 3-11' lanes, 2' C&G, 5' buffer, 10' multi-use trail (Total = 113')

Bridge Details: 6'-0½" prestressed concrete girders spanning 122'-6" c.l. brg.-c.l. brg. and skewed 5° (+)
113' wide Strother Road typical section with 3' clear between MSE walls and end bent beams



Example bridge in District 6

Bridge Cost:	$1,256,000 for 2 bridges, 2 MSE walls and all excavation for the MSE walls
Delta Roadway Cost:	$0
Adjusted Bridge Cost:	$1,256,000

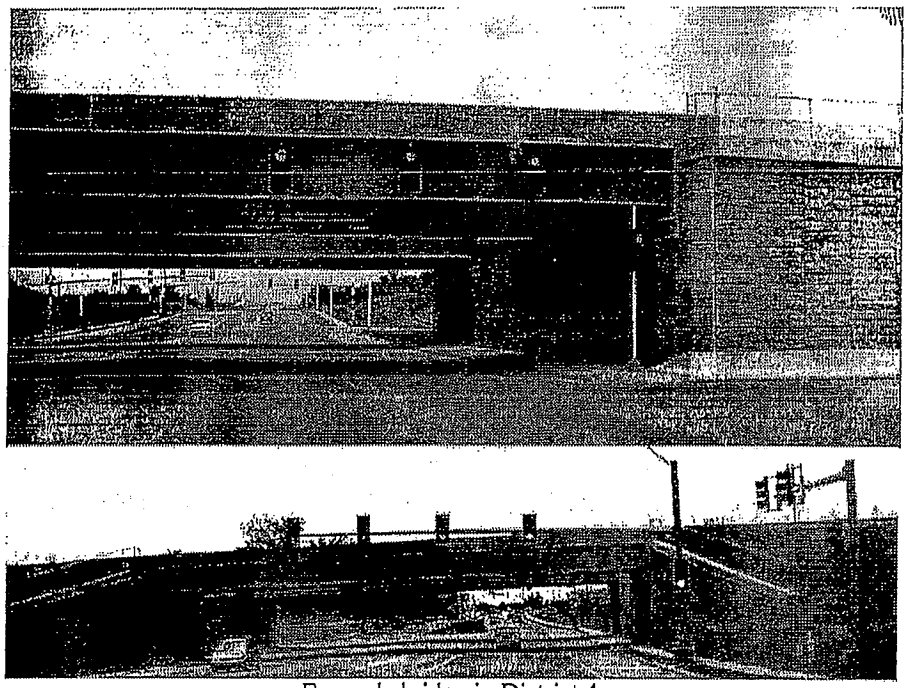
Advantages:
- MSE wall aesthetics.
- Shorter bridges for MoDOT to maintain and to widen.
- Concrete bridges require less maintenance.
- Greater chance of converting the interchange to a single-point in the future – geometrics to be checked then.
- MoDOT would not need to construct intermediate bents in the median of Strother Road when widening I-470.
- Roadway would have a clean and open look.
- Left turn lane(s) could be lengthened.
- Elimination of obstructions (concrete columns & barrier) in median improves roadway safety.
- Elimination of median barrier curbs and required clearances results in less pavement and increased cost savings.

Disadvantages
- Does not allow adjustment of bridge length if 2.5:1 spill slopes can be reduced.
- Widening of I-470 would require modifications to MSE walls in the median.
- Widening of I-470 would require cast-in-place slab construction and an additional girder line; this increases the bridge cost slightly.
- MSE wall construction is not without risks (e.g. Ambassador Drive bridge project with problems related to pile driving, backfill and general fit up of panels) and walls are difficult to repair.
- Piles for widened sections of I-470 would be driven now – slight additional upfront cost and would require piles to be maintained and identified in the future.
- Limits the possibilities for widening the roadway underneath (*deemed not an issue for the Strother Road project*).
- Intersection sight distance issue (sight distance is OK for 35 mph but NW quadrant isn't for 45 mph).
- Little, if any, room to locate slab drains on bridge. Drainage systems are more costly and require maintenance.
- MSE walls and I-470 widening in the median will create a tunnel effect – lighting to be addressed in the future

SINGLE SPAN STEEL BRIDGES WITH MSE WALLS

Roadway Details (N to S): 6' sidewalk, 3' buffer, 2' curb & gutter (C&G), 4-11' lanes, 2' C&G, 4' raised median, 2' C&G, 3-11' lanes, 2' C&G, 5' buffer, 10' multi-use trail (Total = 113')

Bridge Details: Welded steel plate girders (66" web) spanning 122'-6" c.l. brg.-c.l. brg. and skewed 5° (+)
113' wide Strother Road typical section with 3' clear between MSE walls and end bent beams



Example bridge in District 4

Bridge Cost:	$1,470,000 for 2 bridges, 2 MSE walls and all excavation for the MSE walls
Delta Roadway Cost:	$0
Adjusted Bridge Cost:	$1,470,000

Advantages:

- MSE wall aesthetics.
- Shorter bridges for MoDOT to maintain and to widen.
- Greater chance of converting the interchange to a single-point in the future – geometrics to be checked then.
- MoDOT would not need to construct intermediate bents in the median of Strother Road when widening I-470.
- Roadway would have a clean and open look.
- Left turn lane(s) could be lengthened.
- Elimination of obstructions (concrete columns & barrier) in median improves roadway safety.
- Elimination of median barrier curbs and required clearances results in less pavement and increased cost savings.

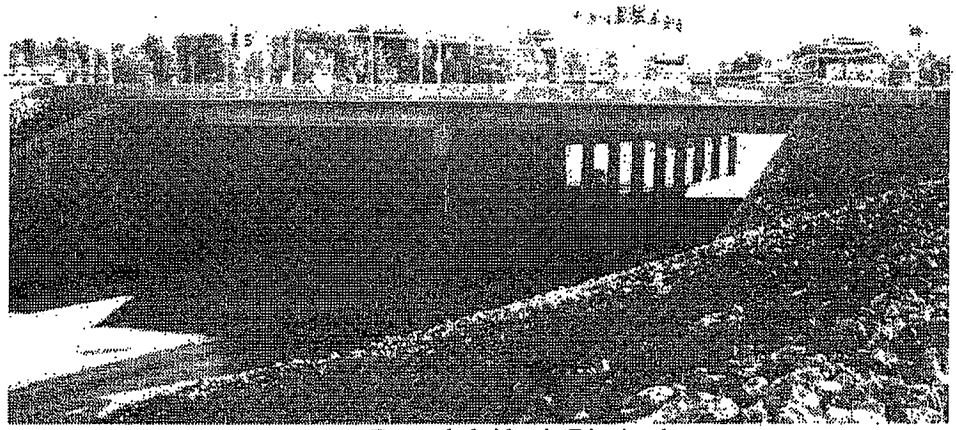
Disadvantages

- Does not allow adjustment of bridge length if 2.5:1 spill slopes can be reduced.
- Widening of I-470 would require modifications to MSE walls in the median.
- MSE wall construction is not without risks (e.g. Ambassador Drive bridge project with problems related to pile driving, backfill and general fit up of panels) and walls are difficult to repair.
- Piles for widened sections of I-470 would be driven now – slight additional upfront cost and would require piles to be maintained and identified in the future.
- Limits the possibilities for widening the roadway underneath (*deemed not an issue for the Strother Road project*).
- Intersection sight distance issue (sight distance is OK for 35 mph but NW quadrant isn't for 45 mph).
- Painted steel girders will require periodic maintenance and eventual re-painting.
- Little, if any, room to locate slab drains on bridge. Drainage systems are more costly and require maintenance.
- MSE walls and I-470 widening in the median will create a tunnel effect – lighting to be addressed in the future

TWO SPAN CONCRETE BRIDGES WITH MSE WALLS

Roadway Details (N to S): 6' sidewalk, 3' buffer, 2' curb & gutter (C&G), 4-11' lanes, 2' C&G, 7' median (2' clearances to 3' column), 2' C&G, 3-11' lanes, 2' C&G, 5' buffer, 10' multi-use trail (Total = 116')

Bridge Details: 66' - 61' (±) prestressed concrete girder (4'-6" tall) spans and skewed 5° (+)
116' wide Strother Road typical section with 3' clear between MSE walls and end bent beams



Example bridge in District 6

Bridge Cost:	$1,275,000 for 2 bridges, 2 MSE walls and all excavation for the MSE walls
Delta Roadway Cost:	$16,000
Adjusted Bridge Cost:	$1,291,000

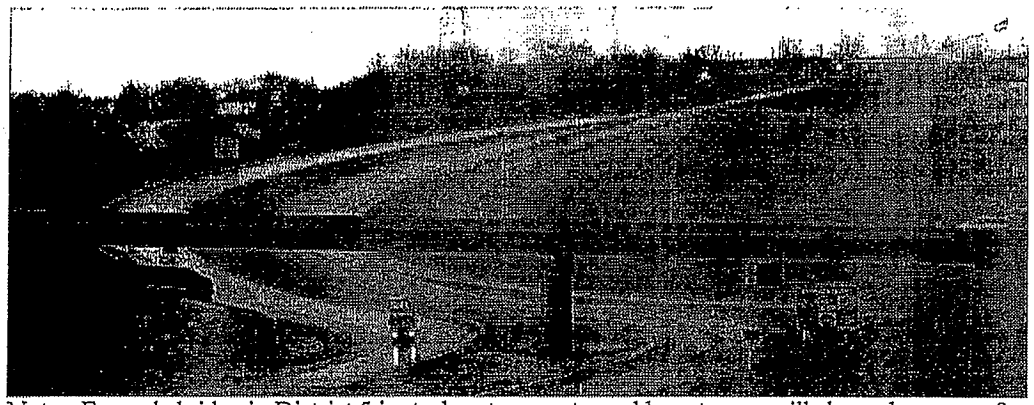
Advantages:
- MSE wall aesthetics.
- Shorter bridges for MoDOT to maintain and to widen.
- Concrete bridges require less maintenance.

Disadvantages
- Does not allow adjustment of bridge length if 2.5:1 spill slopes can be reduced.
- Widening of I-470 would require modifications to MSE walls in the median.
- MSE wall construction is not without risks (e.g. Ambassador Drive bridge project with problems related to pile driving, backfill and general fit up of panels) and walls are difficult to repair.
- Piles for widened sections of I-470 would be driven now – slight additional upfront cost and would require piles to be maintained and identified in the future.
- Limits the possibilities for widening the roadway underneath (*deemed not an issue for the Strother Road project*).
- Intersection sight distance issue (sight distance is OK for 35 mph but NW quadrant isn't for 45 mph).
- MoDOT would need to construct intermediate bents in the median when widening I-470.
- Concrete columns in median could be a safety issue for vehicles leaving the roadway.
- Wider median and clearances to curb & columns increase the Strother Road pavement area and increase the cost.
- Lingering issue about need & method to protect columns in the median with concrete barrier and/or increased clearances.
- Little, if any, room to locate slab drains on bridge. Drainage systems are more costly and require maintenance.
- MoDOT would need to construct intermediate bents in the median of Strother Road when widening I-470.
- MSE walls and I-470 widening in the median will create a tunnel effect – lighting to be addressed in the future

TWO SPAN BRIDGES WITH 2.5:1 SPILL SLOPES

Roadway Details (N to S): 5' sidewalk, 3' buffer, 2' curb & gutter (C&G), 4-11' lanes, 2' C&G, 7' median (2' clearances to 3' column), 2' C&G, 3-11' lanes, 2' C&G, 5' buffer, 8' multi-use trail (Total = 113')

Bridge Details: 103' - 99' (±) prestressed concrete girder (6'-0½" tall) spans and skewed 5° (+)
113' wide Strother Road typical section between 2.5:1 spill slopes



Note: Example bridge in District 5 is steel, not concrete, and has steeper spill slopes because of rock.

Bridge Cost:	$1,300,000 for 2 bridges
Delta Roadway Cost:	$16,000
Adjusted Bridge Cost:	$1,316,000

Advantages

•Allows adjustment of bridge length if geotechnical investigation determines that the 2.5:1 spill slopes can be made steeper. (Note: 2:1 spill slope would reduce cost of bridges by approx. $100,000.)
•Concrete bridges require less maintenance.
•Rock blanket on spill slopes is low maintenance.
•Allows the possibility for widening the roadway underneath (*deemed not an issue for the Strother Road project*).
•Better intersection sight distance than when MSE walls are used.

Disadvantages

•MoDOT would need to construct intermediate bents in the median when widening I-470.
•Concrete columns in median could be a safety issue for vehicles leaving the roadway.
•Wider median and clearances to curb & columns increase the Strother Road pavement area and increase the cost.
•Lingering issue about need & method to protect columns in the median with concrete barrier and/or increased clearances.
•MoDOT would need to construct intermediate bents in the median of Strother Road when widening I-470.

VALUE ENGINEERING CHECK SHEET

TYPE OF WORK

(Check one that applies)

- X Bridge/Structure/Footings
- ☐ Drainage Structures (RCP, RCB, CMP's, ect.)
- ☐ TCP/MOT
- ☐ Paving (PCCP, ect.)
- ☐ Grading/MSE Walls
- ☐ Signal/Lighting/ITS
- ☐ Misc. _____

SUMMARY OF PROPOSAL

(If needed, condense summary to a couple of lines)

_____Build single-span bridge in lieu of planned 2-span bridge.

SCANNING OF DOCUMENT

If the proposal is large, please mark or make note, which pages need to be scanned into the database. If there are special instructions, make note of them here.

_____Scan proposal only.