Form C-104
Rev. 09/2008

VALUE ENGINEERING CHANGE PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date February 25, 2009

Contract ID 080822-404 | Job No. J4I1641D

County Jackson | Original Bid Cost 26999043.35

Contractor Pyramid Contr. Inc/Comanche | By

Designed By Harrington and Cortelyou | Phone 913-764-6225

VECP# 09-25 (to be completed by C.O.) | VECP ☒ or VECP/PDU ☐

1. Description of existing requirements and proposed change(s). Advantages/Disadvantages
   Bridge A21163 and A21164 Bent 2 is designed with pile footings for crash wall. Proposal is to change to drilled shafts to support the crash wall. This eliminates the need for temporary shoring of the UPRR tracks.

2. Estimate of reduction in construction costs. 80,000.00

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.

   February 25, 2009
   (date)

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

   March 1, 2009 (date) — None on contract completion (effect)

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

   (date and/or dates)

FHWA
MO DIV
RECEIVED
APR 20 2009
DA
ADA
Planning
ROW
Env Review
Env Pro
Fin Mgr
Fin Spec
Fin Tech
Bridge
Civil Rights
Safety
Operations
TE1
TE2
TE3
TE4

Additional Comments:

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

Comments: RECOMMEND APPROVAL

Submitted By Resident Engineer — Date: 3/5/09

Comments: BASED ON THE RECOMMEDATION OF THE RE WITH CONCURRENCE FROM MoDOT BRIDGE DIVISION, WE RECOMMEND APPROVAL.

☒ Approval Recommended
☐ Rejection Recommended

District Engineer — Date: 3/18/09

Comments:

☑ Approval Recommended
☐ Rejection Recommended

Federal Highway Administration
Required for FHWA Full Oversight Projects — Date: 4/21/09

Comments: APPROVED PER DISTRICT RECOMMENDATION

☒ Approval
☐ Rejection

State Construction and Materials Engineer — Date: 4/28/09

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

ORIGINAL CONTRACT ITEMS

JOB J4I1641D
ROUTE 470
JACKSON COUNTY

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION
	BRIDGE NO A21163				
2230.00	CLASS 1 EXCAVATION	315.00	CY	145.00	45675.00
2250.00	TEMPORARY SHORING	1.00	LS	63000.00	63000.00
2300.00	PILING 10"	118.00	LF	75.00	8850.00
2310.00	PILING 12"	254.00	LF	160.00	40640.00
2320.00	PRE BORE FOR PILING	266.00	LF	125.00	33250.00
2340.00	CLASS B CONCRETE	163.60	CY	780.00	127608.00
2380.00	RESTEEL	12930.00	LB	1.70	21981.00
	TOTAL SECTION 0010				341004.00
	BRIDGE A21164				
2470.00	CLASS 1 EXCAVATION	325.00	CY	145.00	47125.00
2480.00	TEMPROARY SHORING	1.00	LS	63000.00	63000.00
2530.00	PILING 10"	124.00	LF	75.00	9300.00
2540.00	PILING 12"	264.00	LF	160.00	42240.00
2550.00	PRE BORE FOR PILING	284.00	LF	125.00	35500.00
2570.00	CLASS B CONCRETE	167.00	CY	780.00	130260.00
2610.00	RESTEEL	13720.00	LB	1.75	24010.00
	TOTAL SECTION 0011				351435.00
	TOTAL FOR PROJECT				692439.00

REVISED CONTRACT ITEMS

JOB J4I1641D
ROUTE 470
JACKSON COUNTY

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION
	BRIDGE NO A21163				
2230.00	CLASS 1 EXCAVATION	191.00	CY	145.00	27695.00
2250.00	TEMPROARY SHORING	1.00	LS	35000.00	35000.00
2300.00	PILING 10"	116.00	LF	75.00	8850.00
2320.00	PRE BORE FOR PILING	32.00	LF	125.00	4000.00
2340.00	CLASS B CONCRETE	133.80	CY	780.00	104364.00
2380.00	RESTEEL	22780.00	LB	1.70	38726.00
	DRILLED SHAFTS (3' - 0" DIA)	93.00	LF	600.00	55800.00
	ROCK SOCKETS (3' - 0" DIA)	21.00	LF	955.00	20055.00
	FOUNDATION INSPECTION HOLES	81.00	LF	95.00	7695.00
	SONIC TESTING	1.00	EA	450.00	450.00
	TOTAL SECTION 0010				302635.00
	BRIDGE A21164				
2470.00	CLASS 1 EXCAVATION	204.00	CY	145.00	29580.00
2480.00	TEMPROARY SHORING	1.00	LS	35000.00	35000.00
2530.00	PILING 10"	124.00	LF	75.00	9300.00
2550.00	PRE BORE FOR PILING	38.00	LF	125.00	4750.00
2570.00	CLASS B CONCRETE	143.40	CY	780.00	111852.00
2610.00	RESTEEL	23120.00	LB	1.75	40460.00
	DRILLED SHAFTS (3' - 0" DIA)	84.00	LF	600.00	50400.00
	ROCK SOCKETS (3' - 0" DIA)	21.00	LF	955.00	20055.00
	FOUNDATION INSPECTION HOLES	81.00	LF	95.00	7695.00
	SONIC TESTING	1.00	EA	450.00	450.00
	TOTAL SECTION 0011				309542.00
	TOTAL FOR PROJECT				612177.00

Brian R Burger/D4/MODOT
03/18/2009 03:28 PM

To Perry J Allen/D4/MODOT@MODOT
cc
bcc
Subject Fw: VE proposal for Blue Parkway -J4I1641D

Irving's response.

Thanks,

Brian Burger
MoDOT Construction
(816) 215-7269 cell
(816) 358-1861 office

----- Forwarded by Brian R Burger/D4/MODOT on 03/18/2009 03:28 PM -----

Thomas J Markway/D4/MODOT
03/17/2009 09:35 PM

To "Irving, Kevin" <Kevin.Irving@fhwa.dot.gov>
cc Brian R Burger/D4/MODOT@MODOT, Perry J Allen/D4/MODOT@MODOT
Subject Re: FW: VE proposal for Blue Parkway -J4I1641D

The VE line # on the change order will be at the unit price of $1.00 and units to be constructed of 40,000. We know there are things that can vary like what you are talking about and there also can be some underruns that end up saving us more money. When we are complete, we will adjust the final savings accordingly.
"Irving, Kevin" <Kevin.Irving@fhwa.dot.gov>

"Irving, Kevin" <Kevin.Irving@fhwa.dot.gov>
03/17/2009 06:36 AM

To <Thomas.Markway@modot.mo.gov>
cc
Subject FW: VE proposal for Blue Parkway -J4I1641D

Tom,
As indicated by our bridge engineer in the email below, we can support MoDOT in this VE proposal. What have been the comments from MoDOT on the proposal? Are there any concerns? Please make sure that Ken's comment regarding the potential for the contractor to claim additional monies due to possibilities of having to extend the length of the drilled shaft is addressed. Please give me a call if you have any questions.

Thanks,
Kevin

Kevin Irving
Transportation Engineer

FHWA-Missouri Division
3220 West Edgewood, Suite H
Jefferson City, MO 65109
(573) 638-2612

From: Foster, Ken
Sent: Tuesday, March 10, 2009 8:54 AM
To: Irving, Kevin; Lehmann, Debbie
Subject: RE: VE proposal for Blue Parkway -J4I1641D

Kevin,

I reviewed the proposal and have no objections to the concept. I do wonder where they get the 903 elevation for sound rock at bent 2. It looks like the original piles were to be driven to elevation 898 or so. Would this be something the contractor could come back and indicate the drilled shafts needed to be longer, so need more $$?

At any rate the proposal sounds OK and if MoDOT wishes to proceed, I say OK.

Ken.

From: Irving, Kevin
Sent: Monday, March 09, 2009 8:51 AM
To: Foster, Ken; Lehmann, Debbie
Subject: FW: VE proposal for Blue Parkway -J4I1641D
Ken and/or Debbie,
Could one of you take a look at this proposed VE? The contractor has proposed to construct Bent 2 with rock socketed drilled shafts instead of steel piling. This would eliminate temporary shoring of the railroad tracks. The cost savings would be $80,000. I would like to get a recommendation on whether to approve or not. I would like to have a response back to them within the next couple of days if possible.

Thanks in advance for your efforts,
Kevin

Kevin Irving
Transportation Engineer
FHWA-Missouri Division
3220 West Edgewood, Suite H
Jefferson City, MO 65109
(573) 638-2612

From: Brian.Burger@modot.mo.gov [mailto:Brian.Burger@modot.mo.gov]
Sent: Monday, March 09, 2009 8:17 AM

To: Irving, Kevin
Subject: VE proposal for Blue Parkway -J4I1641D

Kevin,

Here are the revised sheets.

Thanks,

Brian Burger
MoDOT Construction
(816) 215-7269 cell
(816) 358-1861 office

----- Forwarded by Brian R Burger/D4/MODOT on 03/09/2009 08:13 AM -----

Thomas J Markway/D4/MODOT

03/09/2009 06:42 AM

To Brian R Burger/D4/MODOT@MODOT
cc
Subject Fw: VE proposal for Blue Parkway -J4I1641D

scan the revised plan sheets to Kevin.

----- Forwarded by Thomas J Markway/D4/MODOT on 03/09/2009 06:41 AM -----

"Irving, Kevin" <Kevin.Irving@fhwa.dot.gov>

03/06/2009 02:10 PM

To <Thomas.Markway@modot.mo.gov>
cc
Subject RE: VE proposal for Blue Parkway -J4I1641D

Yes please. Could you scan and send them?

Kevin Irving
Transportation Engineer
FHWA-Missouri Division
3220 West Edgewood, Suite H
Jefferson City, MO 65109
(573) 638-2612

From: Thomas.Markway@modot.mo.gov [mailto:Thomas.Markway@modot.mo.gov]
Sent: Thursday, March 05, 2009 9:19 AM
To: Irving, Kevin
Subject: VE proposal for Blue Parkway -J4I1641D

I can't remember if I've already talked to you about this or not. It's a VE proposal to switch to drilled shafts on the Main St. bridge on the Blue Parkway project. I have a set of revised plans that go with it. Do you want me to send them to you too?

Brian R Burger/D4/MODOT
03/18/2009 03:18 PM

To Perry J Allen/D4/MODOT@MODOT
cc
bcc
Subject Fw: J4I1641D I-470 over UPRR/Main Street -- Bent 2 Revisions

Thanks,

Brian Burger
MoDOT Construction
(816) 215-7269 cell
(816) 358-1861 office

----- Forwarded by Brian R Burger/D4/MODOT on 03/18/2009 03:14 PM -----

Thomas J Markway/D4/MODOT
02/05/2009 07:38 AM

To Brian R Burger/D4/MODOT@MODOT
cc
Subject Fw: J4I1641D I-470 over UPRR/Main Street -- Bent 2 Revisions

----- Forwarded by Thomas J Markway/D4/MODOT on 02/05/2009 07:32 AM -----

Ronald C Temme/SC/MODOT
02/04/2009 01:46 PM

To Thomas J Markway/D4/MODOT@MODOT
cc "Mark Zacher (Mark.Zacher@modot.mo.gov)" <Mark.Zacher@modot.mo.gov>, Steve Pellegrino <SPellegrino@hcbridges.com>, MCarroll@hcbridges.com, Alan D Miller/SC/MODOT@MODOT
Subject Re: FW: J4I1641D I-470 over UPRR/Main Street -- Bent 2 Revisions

Tom,
In regards to the consultants response to my comments from 1/9/09:
1) I have received the CD of H&Cs design computations for the Bt 2 and the crashwalls.
2) H&C has considered earth pressure against the crashwall in their computations. Our concern was for deflection of the crashwalls and the transfer of the earth pressure loads against the bridge columns. The plans require the columns to be wrapped with 3/4" jt filler to accomodate a slight deflection (which occurs when active earth pressure develops). H&Cs design should have this concern addressed.
3) H&C indicated that the sequence of work for placement of the slope and fill around the crashwalls will address my concern for shoving the walls into the columns.
4) Consultant stated that the bridge shafts will be cored. This will be acceptable. Since we typically use CSL for testing for all shafts I wanted to make sure that some quality assurance method was used for all the bridge shafts. Regarding the crashwalls, if measures are taken as mentioned below for insuring the integrity of the hole, then testing or coring may be waived for the crashwall shafts, unless Construction has concerns for the quality of the concrete placed in which case cores can be taken.
5) H&C will add the B2 concrete note to the plans for the drilled shafts.

6) H&C will remove the original plan note from their VE plans that does not apply to drilled shaft foundations.
7) It is acceptable if the contractor doesn't want to add extra length to the rebar in case the drilled shaft must be drilled deeper. H&C said the contractor can splice the bars if that is needed. It would be at the contractors own risk if this occurs and results in delays.
8) The 3' embeddment of the rock sockets under the crashwalls will be acceptable provided the good quality rock is encounterd for the full 3' length. Close inspection of the quality should be made.

Casing Question
The UPRR approved the design change to drilled shafts at Bt 2 provided MoDOTs geotechnical group confirmed if a temporary or permanent steel casing is required to prevent the hole caving in. This question was submitted to Alan Miller, and Alan's reply was based on the information he had for Bents 1 and 3 (he did not have geotech info for Bt 2). He stated it appeared that temporary casing would suffice, but since the holes would be adjacent toa RR he recommended permanent casing.

I recently received the attached photos of the open cut that the contractor made at Bt 3 of these bridges over the UPRR. If the soil at Bt 2 is similar to that at Bt 3 then I would definitely have concerns for the holes staying open. I would agree with Alan that temporary casing, at the least would, would be needed, but then there is also the concern for the ground vibrations from passing trains causing problems. If the shaft concrete is still in a fluid state after a temporary casing is pulled then vibrations could cause partial collapse and contamination of our concrete. It would be prudent for some positive method of protection be provided that will prevent debris from collapsing into while it open and when the concrete has not yet taken a set. We would be agreeable to something less substantial than the typical 1/2" (min) thick pipe casing, if the consultant would so recommend. I believe Kansas uses corrugated pipe, and I recall that MoDOT may have been used something similar for a recent bridge replacement on the south leg of the Downtown Loop when there was a caving problem.

I-470 over UPRR Bt 3.jpg I-470 over UPRR Bt 3 Photo.jpg

When the plans have been finalized will will need 12 half size paper copies of the plans for the standard Change Order distribution, and 1 copy of the Microstation plans on CD.

If you have any questions please email or call me 573 751-3801.

Mike Carroll <MCarroll@hcbridges.com>

Mike Carroll
<MCarroll@hcbridges.com>
01/21/2009 05:23 PM

To "Mark Zacher (Mark.Zacher@modot.mo.gov)" <Mark.Zacher@modot.mo.gov>
cc "Ron Temme " <Ronald.Temme@modot.mo.gov>, Steve Pellegrino <SPellegrino@hcbridges.com>, Thomas Markway <Thomas.Markway@modot.mo.gov>
Subject FW: J4I1641D I-470 over UPRR/Main Street -- Bent 2 Revisions

Mark,

We wanted to give you our opinion regarding the drilled shaft construction. Based on the soils report, the soil at the site is a very stiff clay and it seems reasonable to us that caving will not be a problem. Also, with the absence of ground water, we believe the holes can be easily cleaned out and inspected. Therefore, we do not believe casings are required for the drilled shaft construction.

Please let us know if you need further information.

Thank you,

Mike Carroll, P.E.

Harrington & Cortelyou, Inc.

911 Main Street, Suite 1900
Kansas City, MO 64105-5333

P: 816-421-8386 | F: 816-471-6109 | www.hcbridges.com

Confidentiality Notice: This transmission contains confidential information, which is legally privileged. The information is intended only for the recipient named above. If you have received this email in error, please notify us immediately at 816 421-8386 to arrange for the return or disposition of the documents. You are hereby notified that any disclosure, copying, or the taking of any action in reliance upon the contents of this transmission is strictly prohibited.

From: Joe Ritz [mailto:joeritz@swbell.net]
Sent: Wednesday, January 07, 2009 10:32 AM
To: Kevin Eisenbeis
Subject: Fw: I-470 Bent 2 Revisions

--- On **Wed, 1/7/09, Mark.Zacher@modot.mo.gov** <*Mark.Zacher@modot.mo.gov*> wrote:

From: Mark.Zacher@modot.mo.gov <Mark.Zacher@modot.mo.gov>
Subject: Fw: I-470 Bent 2 Revisions
To: Thomas.Markway@modot.mo.gov, joeritz@swbell.net
Date: Wednesday, January 7, 2009, 9:42 AM

Tom and Joe,

Below is the UP reply to the request to change the foundation design for Bent 2 within the UP's ROW. Please let me know how to reply to the UP"s conditional approval.

Thanks,

Mark Zacher
Railroad Projects Manager
Missouri Department of Transportation
573-526-3577

----- Forwarded by Mark D Zacher/SC/MODOT on 01/07/2009 09:40 AM -----

DWMCKERN@up.com

01/07/2009 09:36 AM

To Mark.Zacher@modot.mo.gov
cc
Subject I-470 Bent 2 Revisions

We have no objections to the use of drilled shafts at bent #2. The revision is approved provided MODOTs geotechnical group confirms if a temporary or permanent steel casing is required to prevent the hole from caving during construction.

David W. McKernan
Manager of Industry & Public Projects
Union Pacific RR Co.
100 North Broadway, Suite 1500

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

WIDEN EXISTING (44'-58'-58'-44') CONT. COMPOSITE I-BEAM SPANS

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	1A

JOB NO. J4I1641D

CONTRACT ID.

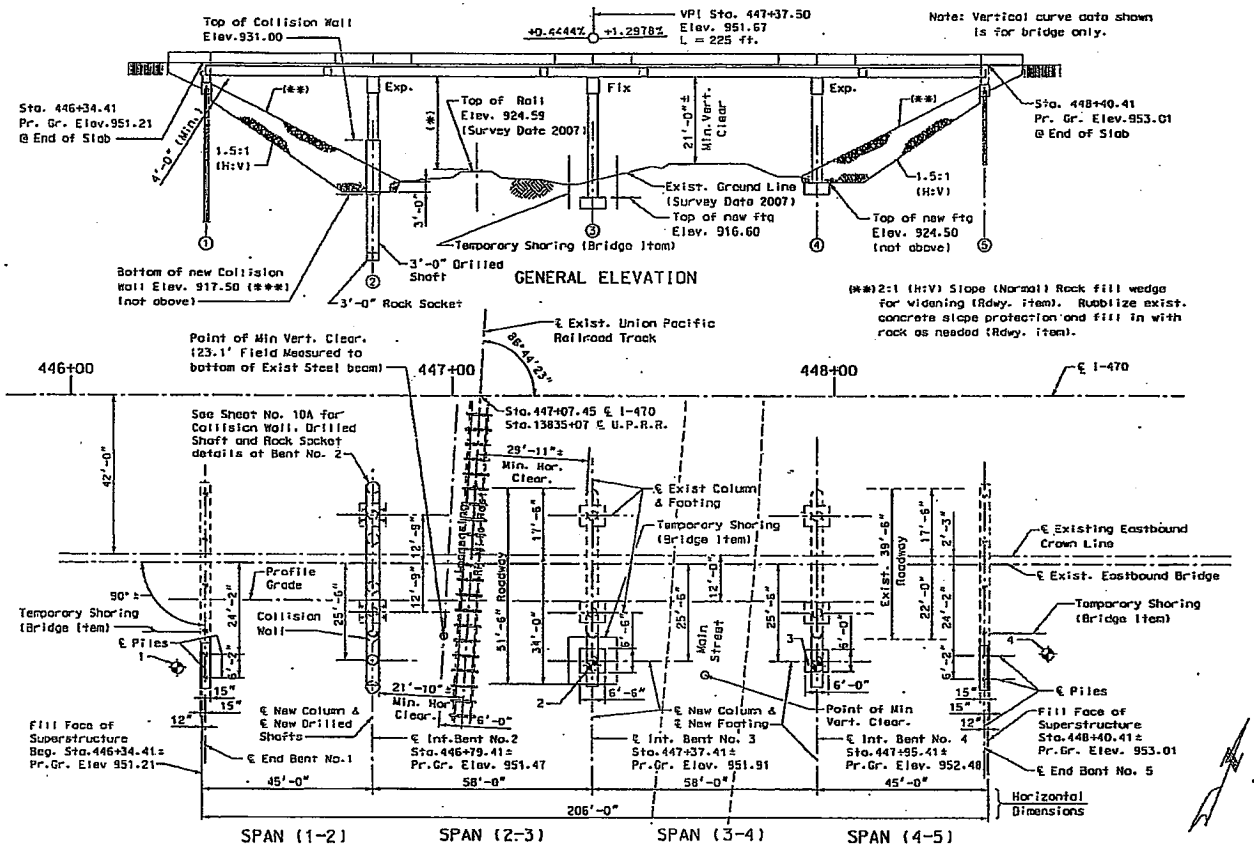
PROJECT NO.

COUNTY JACKSON DATE

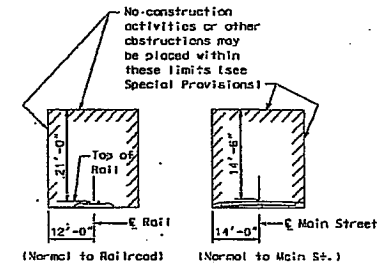
SEC/SUR 36 TWP 48N RGE 32W

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8385
Certificate of Authority No.: 000332

(***) See Sheet No. 10A for elevations of Drilled Shaft and Rock Sockets.



PLAN



MINIMUM CONSTRUCTION CLEARANCES

(Not to scale)

STATE OF MISSOURI STEPHEN A. PELLEGRINO NUMBER PE-19570 REGISTERED PROFESSIONAL ENGINEER

11-26-08

This set of Plans is for Revisions made by Harrington & Cortelyou, Inc. to Bent 2 only. Other information from the Contract Plans has not been checked by Harrington & Cortelyou, Inc.

"⊕" Indicates location of borings.

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 Sheets No. 3 and 4. 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 any other documentation not expressly warranted, which the contractor may obtain from the Commission.

Designed Feb. 2008
Detailed Feb. 2008
Checked Mar. 2008

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

Notes:

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 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

(*) Final vertical clearance from top of rails to bottom of superstructure shall be at least 23.1'. Track elevations should be verified in the field prior to construction to determine if the final vertical clearance shown will be obtained.

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

Sheet No. 1A of 33

New sheet. Replaces sheet 1. 11/21/08

BM #15-E.
FOUND CHISELED PLUS ON THE WEST END OF THE SOUTH HUB GUARD OF BRIDGE OVER MAIN STREET AND RAIL ROAD TRACKS OF THE EASTBOUND LANE OF I-470.
ELEVATION = 953.55' I-470 STATION 446+29.87, 65.01' RT

WIDEN EXISTING BRIDGE OVER UNION PAC. R.R. & MAIN STREET

STATE ROAD FROM RTE. 50 TO DOUGLAS ST.

ABOUT 1 MILE E. OF RTE. 50

STA.446+34.41

STD.617.10

STD.706.35

A21163

REV.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

WIDEN EXISTING (44'-58'-58'-44') CONT. COMPOSITE I-BEAM SPANS

Burns & McDonnell

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	1

JOB NO. J411641D

CONTRACT ID.

PROJECT NO.

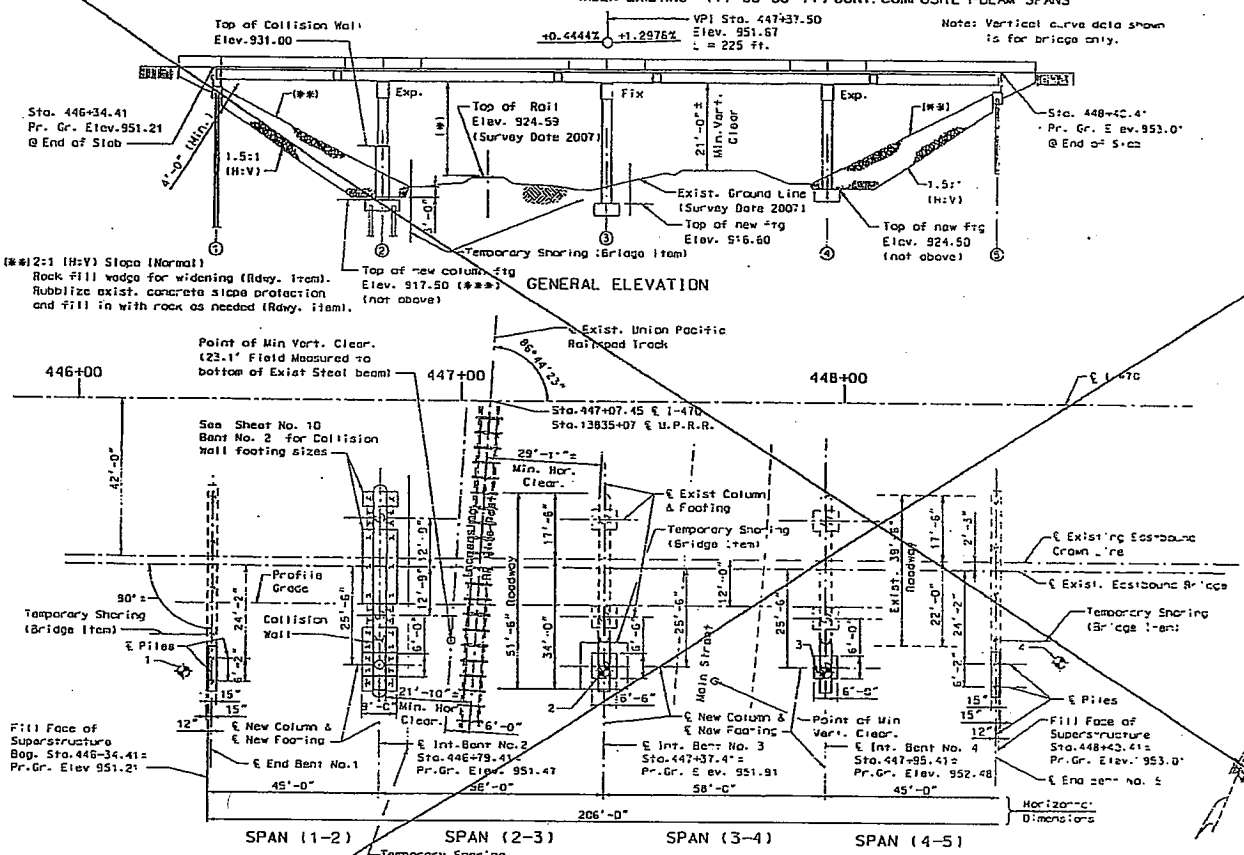
COUNTY JACKSON

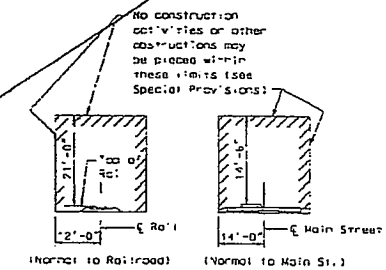
DATE

SEC/SUB 36 TWP 48N RGE 32W

(***) See Sheet No. 10 for elevations at Collision wall footings.

Note: Vertical curve data shown is for bridge only.





MINIMUM CONSTRUCTION CLEARANCES

(Not to scale)

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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 any other documentation not expressly warranted, which the contractor may obtain from the Commission.

Designed Feb. 2008
Detailed Feb. 2008
Checked Mar. 2008

Notes:

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

BM #15-E.
FOUND CHISELED PLUS ON THE WEST END OF THE SOUTH HUB GUARD OF BRIDGE OVER MAIN STREET AND RAIL ROAD TRACKS OF THE EASTBOUND LANE OF I-470.
ELEVATION = 953.55' I-470 STATION 446+29.87- 65.01' RT

WIDEN EXISTING BRIDGE OVER UNION PAC. R.R. & MAIN STREET

STATE ROAD FROM RTE. 50 TO DOUGLAS ST.

ABOUT 1 MILE E. OF RTE. 50

STA.446+34.41

STD.617.10

STD.706.35

A21183

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

Sheet No. 1 of 33

Revised 11/2/05

ROUTE	STATE	DISTRICT	SHEET NO.
1470	MO	4	2A

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

ESTIMATED QUANTITIES

ITEM		SUBSTR.	SUPERSTR.	TOTAL
Class 1 Excavation	cu. yard	191		191
Class 1 Excavation in Rock	cu. yard	15		15
Temporary Shoring	lump sum			1
Removal of Concrete Wearing Surface	sq. foot		7931	7931
Partial Removal of Existing Bridge Decks	sq. foot		490	490
Partial Removal of Substructure Concrete	lump sum			1
Drilled Shafts (3'-0" Dia.)	linear foot	93		93
Rock Sockets (3'-0" Dia.)	linear foot	21		21
Foundation Inspection Holes	linear foot	81		81
Concrete Coring	linear foot	22		22
Low Slump Concrete Wearing Surface	sq. yard		893	893
Structural Steel Piles (10 in.)	linear foot	118		118
Pre-Bore for Piling	linear foot	32		32
Pile Point Reinforcement	each	4		4
Class B Concrete (Substructure)	cu. yard	133.8		133.8
Slab on Steel	sq. yard		328	328
* Safety Barrier Curb	linear foot		224	224
Substructure Repair (Formed)	sq. foot	165		165
Reinforcing Steel (Bridges)	pound	22,780		22,780
Fabricated Structural Carbon Steel (I-Beam)	pound		3970	3970
Fabricated Structural Low Alloy Steel (I-Beam)A709, Grade 50	pound		51,750	51,750
Slab Drain	each		4	4
Surface Preparation for Recoating Structural Steel	sq. foot		8200	8200
Field Application of Inorganic Zinc Primer	sq. foot		8200	8200
Intermediate Field Coat (System G)	sq. foot		11,000	11,000
Finish Field Coat (System G)	sq. foot		1700	1700
Laminated Neoprene Bearing Pad Assembly	each		6	6

Notes:
* Safety barrier curb shall be cast-in-place option or slip-form option.

All concrete between the upper and lower construction joints in the end bents is included in the Estimated Quantities for Slab on Steel.

All concrete for the collision wall is included in the quantity for Class B Concrete (Substructure). All reinforcement for the collision wall is included in the quantity for Reinforcing Steel (Bridges).

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Steel.

Estimated Quantities for Slab on Steel

ITEM		TOTAL
Class B-2 Concrete	cu. yard	90.7
Reinforcing Steel	pound	24,490

The table of Estimated Quantities for Slab on Steel represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for forms, all concrete and reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities, but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II, or III.

Slab shall be cast-in-place with conventional forming. Stay-in-place corrugated metal forms or precast prestressed panels will not be permitted.

General Notes:

Design Specifications:
2002 - AASHTO 17th Edition
Load Factor Design
Seismic Performance Category A
Acceleration Coefficient = 0.04
Bridge Deck Rating = 7

Design Loading:
HS20-44
15 #/Sq. Ft. Future Wearing Surface
Military 24,000 # Tandem Axle
Earth - 120 #/Cu. Ft., Equivalent Fluid Pressure 45 #/Cu. Ft.
Fatigue Stress - Case I

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-1 Concrete (Safety Barrier Curb)	f'c = 4,000 psi
Class B-2 Concrete (Superstructure, except Safety Barrier Curb)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Carbon Steel (ASTM A709 Grade 36)	fy = 36,000 psi
Structural Steel (ASTM A709 Grade 50)	fy = 50,000 psi
Steel Pile (ASTM A709 Grade 36) fb = 9,000 psi,	fy = 36,000 psi

Fabricated Steel Connections:
Field connections shall be made with ¾" diameter high strength bolts and 13/16" diameter holes, except as noted.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1½", unless otherwise shown.

Structural Steel Protective Coatings:
Protective Coating: System G in accordance with Sec 1081.
Surface Preparation: Surface preparation of the existing steel shall be in accordance with Sec 1081 for "Recoating of Structural Steel (System G or H)". The cost of surface preparation will be considered completely covered by the contract unit price per sq. foot for "Surface Preparation for Recoating Structural Steel".

Prime Coat: The cost of the prime coat for the existing steel will be considered completely covered by the contract unit price per sq. foot for "Field Application of Inorganic Zinc Primer". The cost of the prime coat for new steel will be considered completely covered by the contract unit price for the Fabricated Structural Steel.

Field Coat: The color of the finish field coat shall be Gray (Federal Standard #26373). The cost of the intermediate field coat will be considered completely covered by the contract unit price per sq. foot for "Intermediate Field Coat (System G)". The cost of the finish field coat will be considered completely covered by the contract unit price per sq. foot for "Finish Field Coat (System G)."

At the option of the contractor, the intermediate and finish field coats for new steel may be applied in the shop. The contractor shall exercise extreme care during all phases of loading, hauling, handling, erection and pouring of the slab to minimize damage and shall be fully responsible for all repairs and cleaning of the coating systems as required by the engineer.

** Piles for Bent No. 2 collision wall do not require driving. These piles shall be centered in oversized prebored holes with minimum diameter of 2'-0" and shall be backfilled with concrete to top of rock. Minimum socket into competent rock shall be 3'-0". Concrete shall have a minimum strength at 28 days of 4000 psi, a min. slump or placement of 5" (+/- 1") and maximum aggregate size of ¾". Fill all void space above concrete with sand per Sec 702.4.3, or at contractor's option, backfill with concrete as indicated to extend to the bottom of collision wall footing.

General Notes (Cont.):

Miscellaneous:
Traffic over structure to be maintained during construction. See Roadway plans for traffic control.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Sec 106 and Field Section (FS-712) from Materials Manual.

"Sec" refers to the sections in the standard and supplemental specifications unless specified otherwise.

Repair of Concrete Deck (Half- Soling):

Payment for repair of concrete deck (half-soling) for a maximum quantity of 50 square feet will be considered completely covered by the contract unit price for the Low Slump Concrete Wearing Surface. If the quantity of half-soling is greater than 50 square feet, payment for the amount in excess of 50 square feet will be paid for in accordance with Sec 104.3.

Revised Structures:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field before ordering new material.

Bars bonded in old concrete not removed shall be cleanly stripped and embedded into new concrete where possible. If length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and not covered with new concrete shall be coated with an approved qualified special mortar in accordance with Sec 704.

In order to maintain grade and a minimum thickness of overlay as shown on plans it may be necessary to use additional quantities of overlay at various locations throughout the structure. The cost of furnishing and installing the overlay will be considered completely covered in the contract unit price, including all additional labor, materials or equipment for variations in thickness of overlay.

Longitudinal dimensions are based on the orginal design plans.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19512
PROFESSIONAL ENGINEER

11-24-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 2A of 33

1 New sheet. Replaces sheet 2. 11/21/08

A21163

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	2

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

ESTIMATED QUANTITIES

	ITEM		SUBSTR.	SUPERSTR.	TOTAL
	Class 1 Excavation	cu. yard	315		315
	Class 1 Excavation in Rock	cu. yard	15		15
	Temporary Shoring	lump sum			1
	Removal of Concrete Wearing Surface	sq. foot		7931	7931
	Partial Removal of Existing Bridge Decks	sq. foot		490	490
	Partial Removal of Substructure Concrete	lump sum			1
	Low Slump Concrete Wearing Surface	sq. yard		893	893
	Structural Steel Piles (10 in.)	linear foot	118		118
	Structural Steel Piles (12 in.)	linear foot	254		254
	Pre-Bore for Piling	linear foot	266		266
	Pile Point Reinforcement	each	8		8
	Class B Concrete (Substructure)	cu. yard	163.6		163.6
	Slab on Steel	sq. yard		328	328
*	Safety Barrier Curb	linear foot		224	224
	Substructure Repair (Formed)	sq. foot	165		165
	Reinforcing Steel (Bridges)	pound	12,930		12,930
	Fabricated Structural Carbon Steel (I-Beam)	pound		3970	3970
	Fabricated Structural Low Alloy Steel (I-Beam)A709, Grade 50	pound		51,750	51,750
	Slab Drain	each		4	4
	Surface Preparation for Recoating Structural Steel	sq. foot		8200	8200
	Field Application of Inorganic Zinc Primer	sq. foot		8200	8200
	Intermediate Field Coat (System G)	sq. foot		11,000	11,000
	Finish Field Coat (System G)	sq. foot		1700	1700
	Laminated Neoprene Bearing Pad Assembly	each		6	6

Notes:

* Safety barrier curb shall be cast-in-place option or slip-form option.

All concrete between the upper and lower construction joints in the end bents is included in the Estimated Quantities for Slab on Steel.

All concrete for the collision wall is included in the quantity for Class B Concrete (Substructure). All reinforcement for the collision wall is included in the quantity for Reinforcing Steel (Bridges).

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Steel.

Estimated Quantities for Slab on Steel

ITEM		TOTAL
Class B-2 Concrete	cu. yard	90.7
Reinforcing Steel	pound	24,490

The table of Estimated Quantities for Slab on Steel represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for forms, all concrete and reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II, or III.

Slab shall be cast-in-place with conventional forming. Stay-in-place corrugated metal forms or precast prestressed panels will not be permitted.

Footing & Pile Data

	Bent No.		1	2 (Coll. Wall)	2 (Column)	3	4	5
Bearing Pile	Pile Type and Size		HP10 X 42	HP12 X 53	HP12 X 53			HP10 X 42
	Number		2	14	4			2
	Approximate Length	feet	40	12015".2013"	12			19
	Design Bearing	kip	85	61	95			85
	Hammer Energy Required	foot-pound	12,600	**	15,750			12,600
Spread Footings	Foundation Material					Limestone	Shale	
	Design Bearing	kip/sq. foot				10	10	

Minimum energy requirement of hammer is based on pile length and design bearing value of piles.
All piles, except for Bent No. 2 collision wall, shall be driven to practical refusal.
Prebore for piles at Bent No. 2 to elevation 903.5.
Prebore for piles at Bent No. 5 to elevation 930.00.
Backfill all prebored piles in accordance with Sec 702.4.3.
Manufactured pile point reinforcement shall be used on all driven piles in this structure.

Detailed Feb. 2008
Checked Mar. 2008

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

General Notes:

Design Specifications:
2002 - AASHTO 17th Edition
Load Factor Design
Seismic Performance Category A
Acceleration Coefficient = 0.04
Bridge Deck Rating = 7

Design Loading:
HS20-44
15 #/Sq. Ft. Future Wearing Surface
Military 24,000 # Tandem Axle
Earth - 120 #/Cu. Ft., Equivalent Fluid Pressure 45 #/Cu. Ft.
Fatigue Stress - Case I

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-1 Concrete (Safety Barrier Curb)	f'c = 4,000 psi
Class B-2 Concrete (Superstructure, except Safety Barrier Curb)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Carbon Steel (ASTM A709 Grade 36)	fy = 36,000 psi
Structural Steel (ASTM A709 Grade 50)	fy = 50,000 psi
Steel Pile (ASTM A709 Grade 36)	fb = 9,000 psi; fy = 36,000 psi

Fabricated Steel Connections:
Field connections shall be made with 3/4" diameter high strength bolts and 13/16" diameter holes, except as noted.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Structural Steel Protective Coatings:
Protective Coating: System G in accordance with Sec 1081.
Surface Preparation: Surface preparation of the existing steel shall be in accordance with Sec 1081 for "Recoating of Structural Steel (System D or H)". The cost of surface preparation will be considered completely covered by the contract unit price per sq. foot for "Surface Preparation for Recoating Structural Steel".

Prime Coat: The cost of the prime coat for the existing steel will be considered completely covered by the contract unit price per sq. foot for "Field Application of Inorganic Zinc Primer". The cost of the prime coat for new steel will be considered completely covered by the contract unit price for the Fabricated Structural Steel.

Field Coat: The color of the finish field coat shall be Gray (Federal Standard #26373). The cost of the intermediate field coat will be considered completely covered by the contract unit price per sq. foot for "Intermediate Field Coat (System G)". The cost of the finish field coat will be considered completely covered by the contract unit price per sq. foot for "Finish Field Coat (System G)."

At the option of the contractor, the intermediate and finish field coats for new steel may be applied in the shop. The contractor shall exercise extreme care during all phases of loading, hauling, handling, erection and pouring of the slab to minimize damage and shall be fully responsible for all repairs and cleaning of the coating systems as required by the engineer.

** Piles for Bent No. 2 collision wall do not require driving. These piles shall be centered in oversized prebored holes with a minimum diameter of 2'-0" and shall be backfilled with concrete to top of rock. Minimum socket into competent rock shall be 3'-0". Concrete shall have a minimum strength at 28 days of 4000 psi, a maximum slump at placement of 5" (+/- 1") and maximum aggregate size of 3/8". Fill all void space above concrete with sand per Sec 702.4.3, or at contractor's option, backfill with concrete as indicated to extend to the bottom of collision wall footing.

Sheet No. 2 of 33

General Notes (Cont.):

Maintenance:
Traffic over structure to be maintained during construction. See Roadway plans for traffic control.

High strength bolts, nuts and washers will be supplied for quality assurance as specified in Sec 106 and Field Section (FS-712) from Materials Manual.

"Sec" refers to the sections in the standard and supplemental specifications unless specified otherwise.

Repair of Concrete Deck (Half-Spalling):

Payment for repair of concrete deck (half-spalling) for a maximum quantity of 50 square feet will be considered completely covered by the contract unit price for the Low Slump Concrete Wearing Surface. If the quantity of half-spalling is greater than 50 square feet, payment for the amount in excess of 50 square feet will be paid for in accordance with Sec 104.3.

Revised Structures:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field before ordering new material.

Bars bonded in old concrete not removed shall be cleanly stripped and embedded into new concrete where possible. If length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and not covered with new concrete shall be coated with an approved qualified special mortar in accordance with Sec 704.

In order to maintain grade and a minimum thickness of overlay as shown on plans it may be necessary to use additional quantities of overlay at various locations throughout the structure. The cost of furnishing and installing the overlay will be considered completely covered in the contract unit price, including all additional labor, materials or equipment for variations in thickness of overlay.

Longitudinal dimensions are based on the original design plans.

Revised Feb. 2008

A21183

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	3A

JOB NO. J4I1641D

CONTRACT ID.

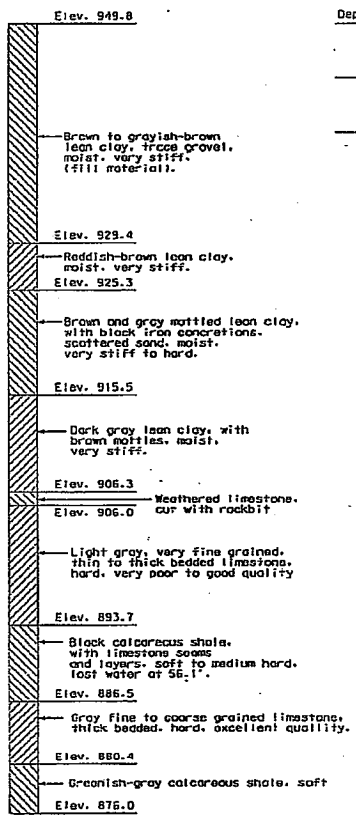
PROJECT NO.

COUNTY JACKSON

DATE

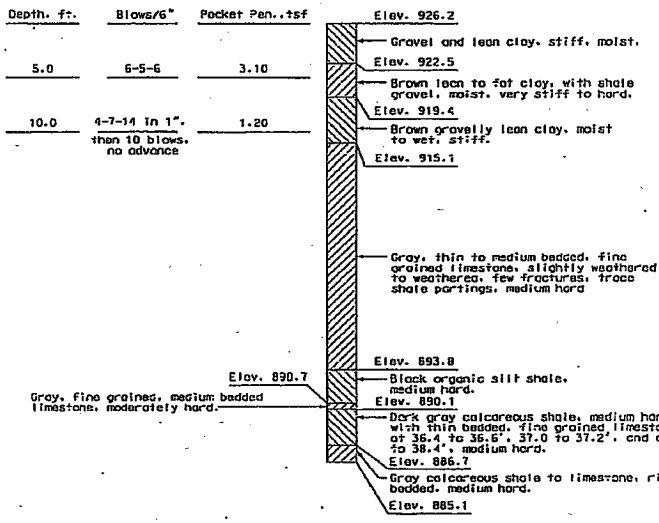
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1500
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

Depth, ft.	Standard Penetration Test Blows/6"	Pocket Pen., tsf
5.0	2-2-3	3.00
10.0	3-3-5	2.25
15.0	3-3-6	2.25
20.0	3-4-7	2.50
25.0	5-7-11	2.75
30.0	3-6-9	7.50
35.0	5-5-6	No Recovery
40.0	3-4-6	2.50



① (Core)

Depth, ft.	Standard Penetration Test Blows/6"	Pocket Pen., tsf
5.0	6-5-6	3.10
10.0	4-7-14 in 1". then 10 blows, no advance	1.20



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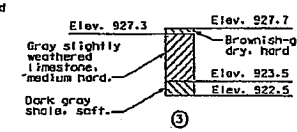


③

ROCK SOCKET ALLOWABLE SIDE RESISTANCE VALUES		
BENT	Elev. From - To	Side Resistance (Tsf)
2	902.0 - 894.0	4.5
	894.0 - 885.0	3.5
	885.0 - 880.0	4.5

FOOTING & PILE DATA							
Bent No.		1	2 (Coll. Wall)	2 (Column)	3	4	5
Bearing Pile	Pile Type and Size	HP10 X 42					HP10 X 42
	Number	2					2
	Approximate Length foot	40					19
	Design Bearing kip	85					85
	Hammer Energy Required foot-pound	12,600					12,600
Spread Footings	Foundation Material				Limestone	Shale	
	Design Bearing kip/sq. foot				10	10	
Rock Socket	Foundation Material		Limestone	Limestone			
	Number		5	1			
	Diameter		3'-0"	3'-0"			
	Design Bearing (Side Resistance) tons		127	254			

Minimum energy requirement of hammer is based on plan length and design bearing value of piles.
All piles, except for Bent No. 2 collision wall, shall be driven to practical refusal.
Prebore for piles at Bent No. 2 to elevation 903.5.
Prebore for piles at Bent No. 5 to elevation 930.00.
Backfill all prebored piles in accordance with Sec 702.4.3.
Manufactured pile point reinforcement shall be used on all driven piles in this structure.
For rock socket allowable side resistance values, see Table. End bearing shall not be considered.
Concrete coring shall be performed on Bent 2 (column) drilled shaft and rock socket.

Note:
For location of borings, see Sheet No. 1A.

⚠ New sheet. Replaces sheet 3. 11/21/08

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-17017
PROFESSIONAL ENGINEER

11-24-08

BORING DATA

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 3A of 33

A21163

ROUTE	STATE	DISTRICT	SHEET NO
I470	MO	4	3

JOB NO. J4I1641D

CONTRACT ID.

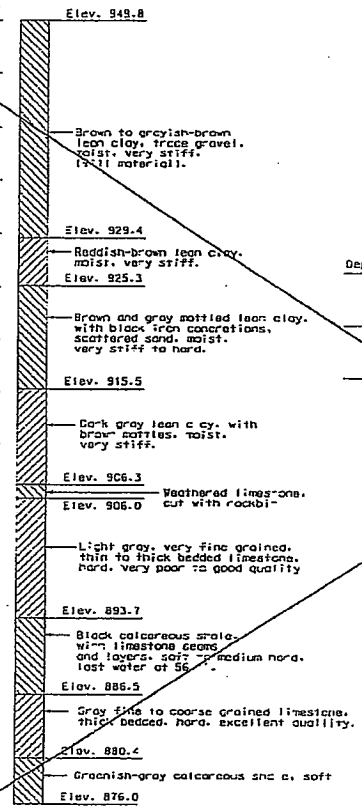
PROJECT NO.

COUNTY JACKSON

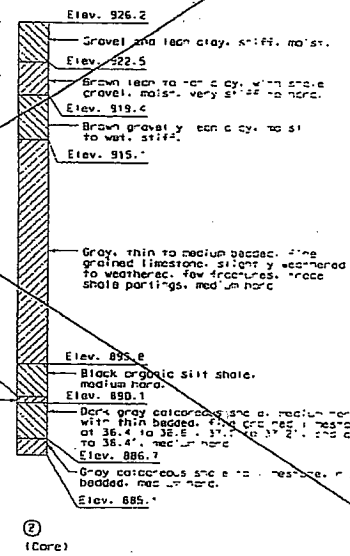
DATE

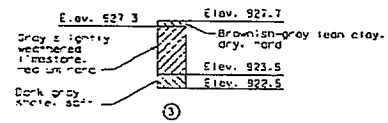
Burns & McDonnell

Depth, ft.	Standard Penetration Test Blows/6"	Pocket Pen., tsf
5.0	2-2-3	3.00
10.0	3-3-5	2.25
15.0	3-3-6	2.25
20.0	3-4-7	2.50
25.0	5-7-11	2.75
30.0	3-6-9	7.50
35.0	5-5-6	No Recovery
40.0	3-4-6	2.50



Depth, ft.	Standard Penetration Test Blows/6"	Pocket Pen., tsf
5.0	6-5-6	3.10
10.0	4-7-14 in 1", then 10 blows, no advance	1.20





BORING DATA

Note: For location of borings, see Sheet No. 1

Dated Feb. 2008
Checked Mar. 2008

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

Sheet No. 3 of 33

Deleted 11/27/08

A21163

S:\Contracts\Comanche Construction\J4I641D\Design Stage\A21163\B1B3.B1 BR Boring Logs 9.01.24 AM 11.24.2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	10A

JOB NO. J4I1641D

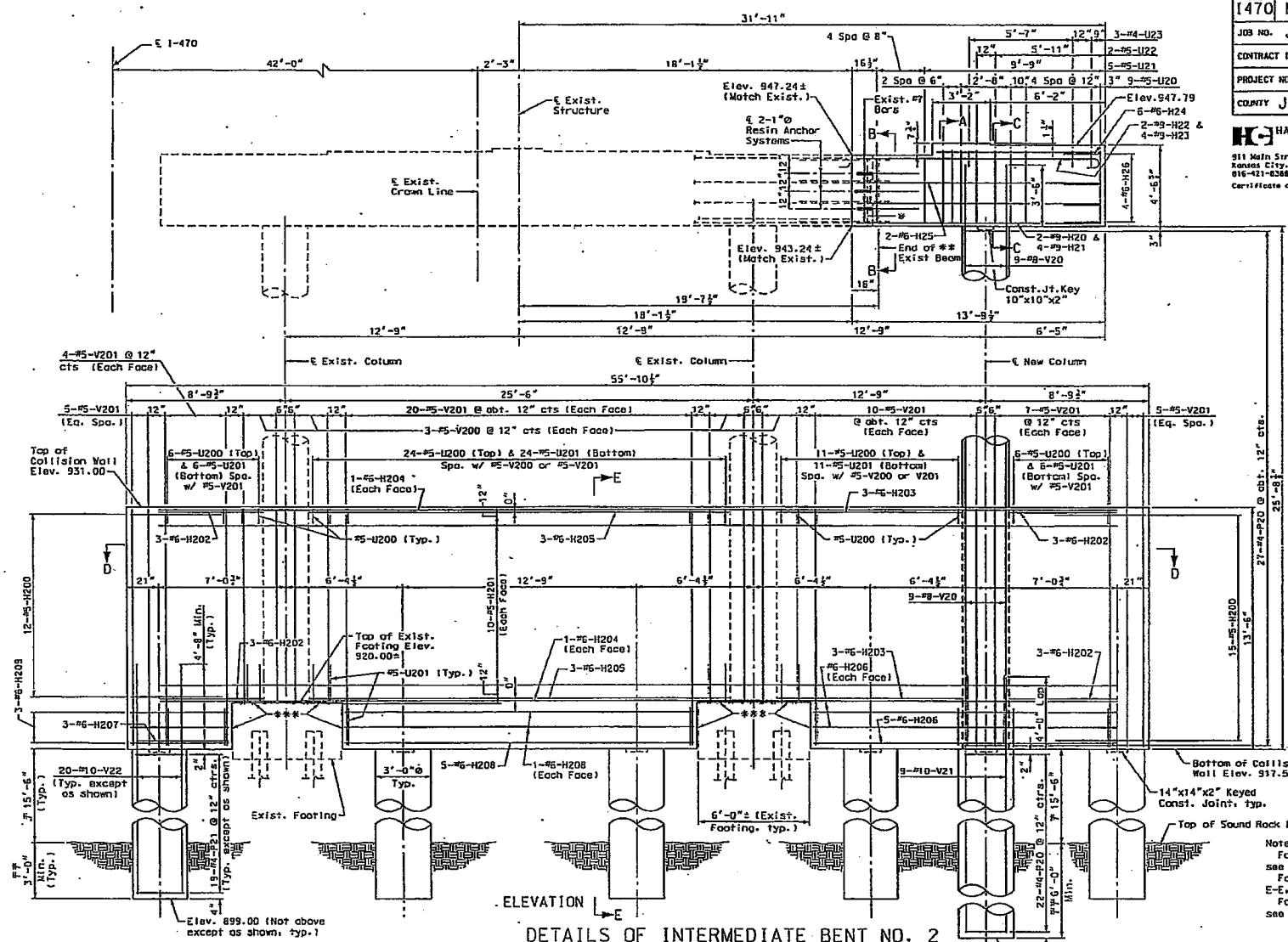
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-6366
Certificate of Authority No.: 000332



* Existing #5 Stirrup

** For concrete removal, see Sheet No. 11A.

*** ¾" Preformed Joint Filler (Typ.)

Ŧ Pay Limits for Drilled Shaft (3ft. Dia. dia.)

ŦŦ Pay Limits for Rock Socket (3ft. Dia. dia.)

Notes:
For Sections B-B and C-C, see Sheet No.11A.
For Sections A-A, D-D and E-E, see Sheet No.12A.
For resin anchor notes, see Sheet No.11A.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER
11-24-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 10A of 33

⚠ New sheet. Replaces sheet 10. 11/21/08

A21163

REV.

S:\Contractors\Comanche Construction\1014-10\J4I1641D\Bridge dwgs\A21163\H & C Dwgs\10A-38915_E9_int-bent2-HC.dgn 9:25:11 AM 11/24/2008

ROUTE	STATE	DISTRICT	SHEET NO.
1470	MO	4	10

JOB NO. J4116410

CONTRACT ID.

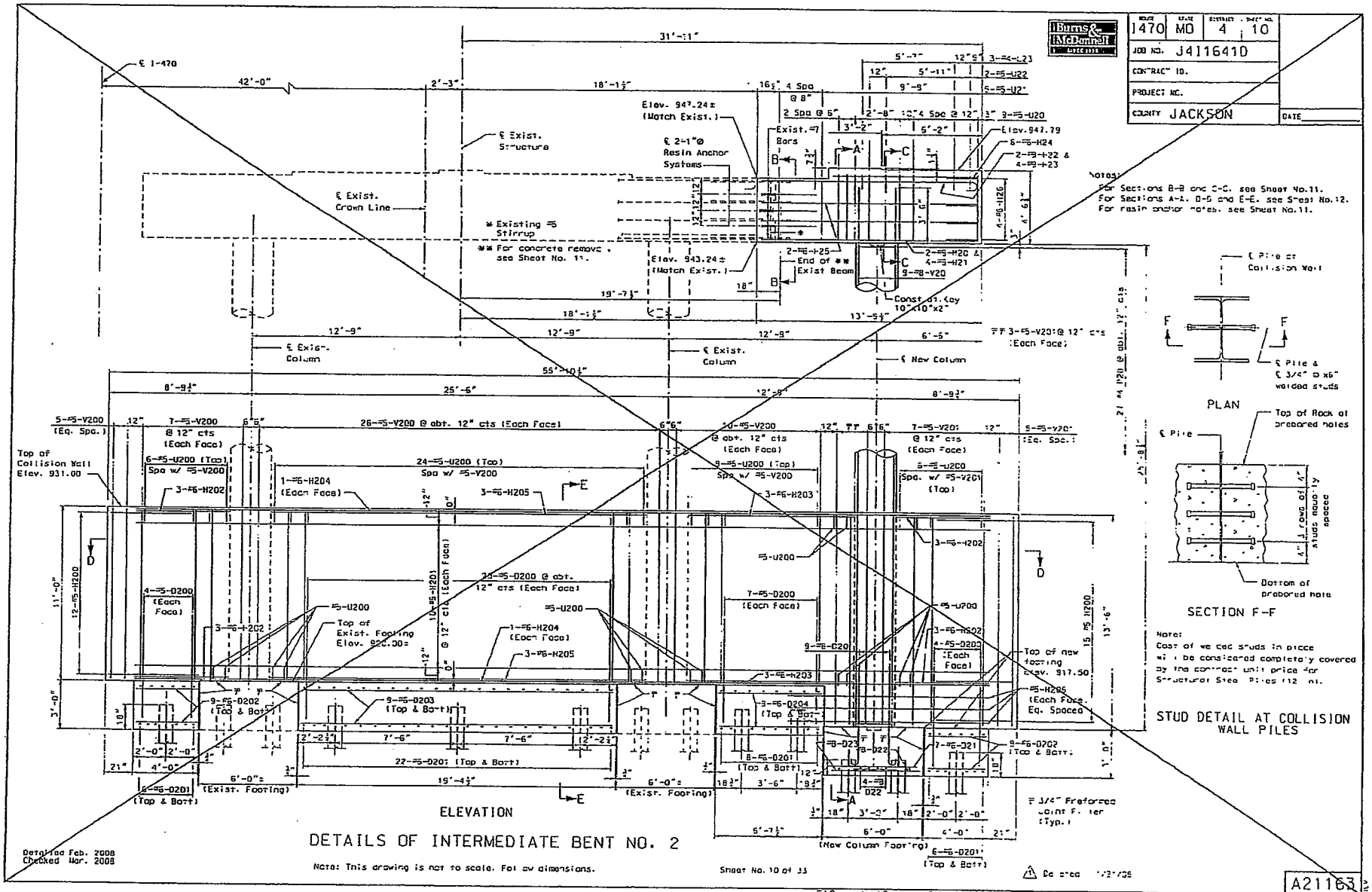
PROJECT NO.

COUNTY JACKSON

DATE

Burns & McDonnell

Notes:
For Sections B-B and C-C, see Sheet No.11.
For Sections A-A, D-D and E-E, see Sheet No.12.
For resin anchor notes, see Sheet No.11.



DETAILS OF INTERMEDIATE BENT NO. 2

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

Detailed Feb. 2008
Checked Mar. 2008

Sheet No. 10 of 33

A21163

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	11A

JOB NO. J4I16410

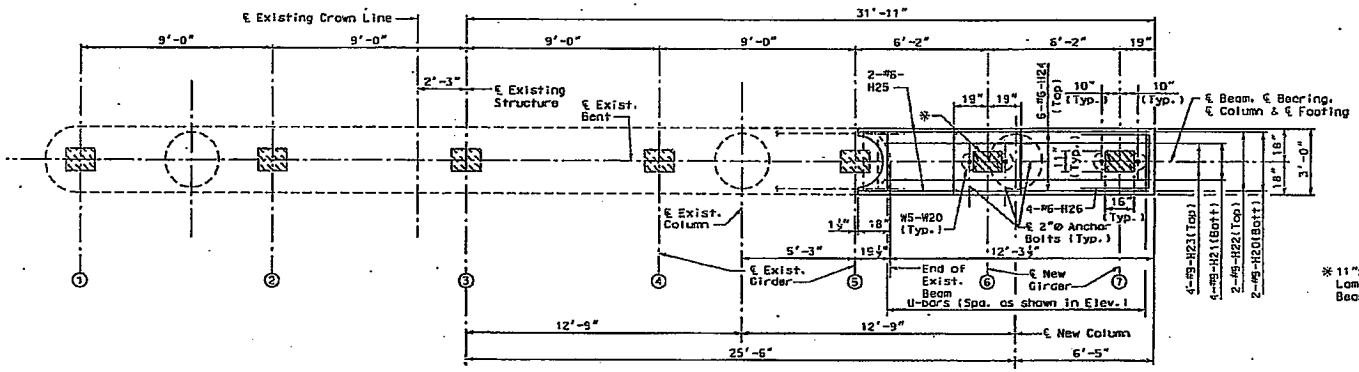
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

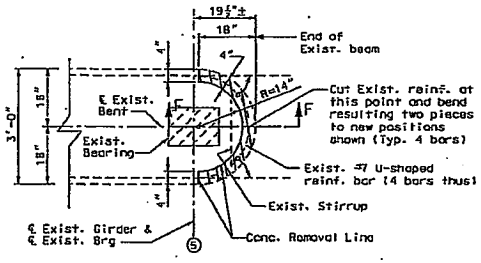
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No. 1 000332



PLAN

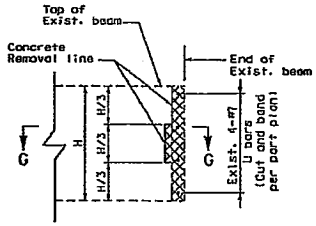
SUBSTRUCTURE QUANTITY TABLE FOR BENT NO. 2		
ITEM		QUANTITY
Class 1 Excavation	cu. yard	121
Drilled Shafts (3 ft. 0 in. Dia.)	linear foot	93
Rock Sockets (3 ft. 0 in. Dia.)	linear foot	21
Foundation Inspection Holes	linear foot	81
Concrete Coring	linear foot	22
Class B Concrete (Substructure)	cu. yard	97.2
Reinforcing Steel (Bridges)	pound	18,410

Note: These quantities are included in the Estimated Quantities Table on Sheet No. 2A.

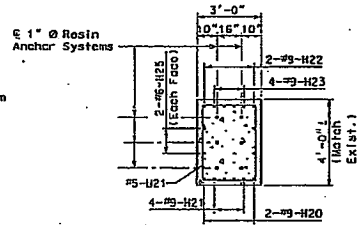


Note:
1. Cut exist. reinf. only where specifically indicated. Do not cut or damage any other reinf.

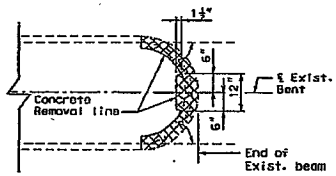
PART PLAN SHOWING CONCRETE REMOVAL AT SOUTH END OF EXIST BENT BEAM



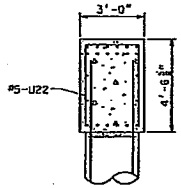
SECTION F-F



SECTION B-B



SECTION G-G



SECTION C-C

Notes:
1. All vertical reinforcement bars in the substructure beams or caps shall be field adjusted to clear piles by at least 1½".
2. All reinforcing bars in the tops of substructure beams or caps shall be spaced to clear anchor bolt wells for bearings by at least ½".
3. The contractor shall use one of the qualified resin anchor systems in accordance with Sec 1035.
4. Cost of furnishing and installing the resin anchor system complete in-place will be considered completely covered by the contract unit price for Class B Concrete (Substructure).
5. The minimum embedment depth in concrete with f'c = 4,000 psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5". A #8 Grade 60 reinforcing bar 4'-3" long shall be substituted for the 1" Ø threaded rod. A #6 Grade 60 reinforcing bar 3'-0" (unless shown otherwise) long shall be substituted for the ¾". threaded rod.
6. For locations of Sections B-B and C-C, see Sheet No. 10A.
7. For details of anchor bolt well, see Sheet No. 14.

DETAILS OF INTERMEDIATE BENT NO. 2

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19947
PROFESSIONAL ENGINEER

11-24-08

Detailed Feb. 2008
Checked Mar. 2008

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

⚠ New sheet. Replaces sheet 11. 11/21/08

A21163

S:\Contractors\Comanche Construction\1014-10\J4I16410\Bridge dwgs\A21163\H & C Dwgs\11A-33516_EG_Int-bent2-HC.dgn 9:28:14 AM 11/24/2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	11

JOB NO. J4I1641D

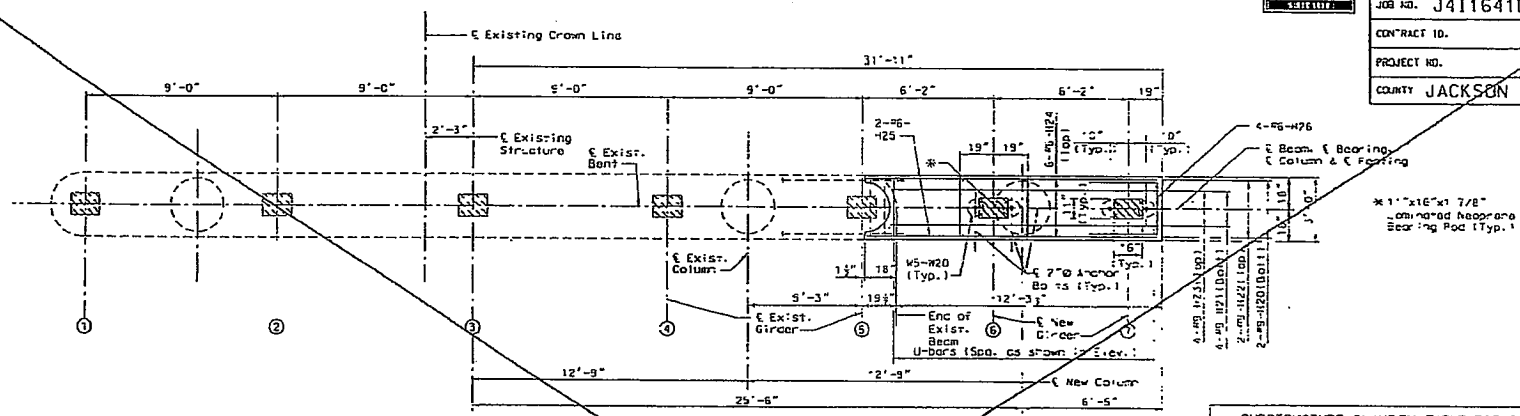
CONTRACT ID.

PROJECT NO.

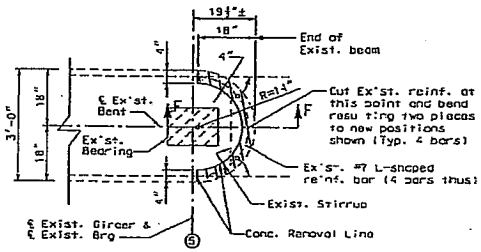
COUNTY JACKSON

DATE

Burns & McDonnell Engineers



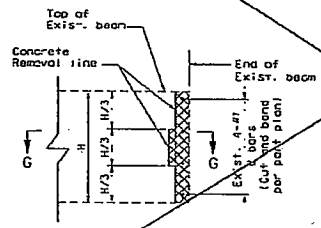
PLAN



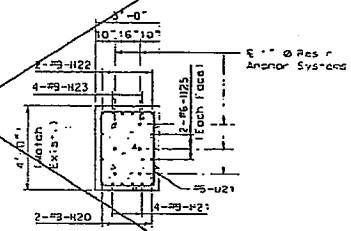
Note:

1. Cut exist. reinf. only where specifically indicated. Do not cut or damage any other reinf.

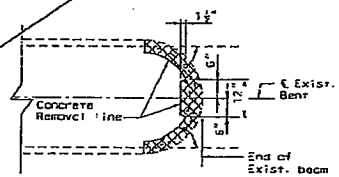
PART PLAN SHOWING CONCRETE REMOVAL AT SOUTH END OF EXIST BENT BEAM



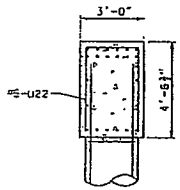
SECTION F-F



SECTION B-B



SECTION G-G



SECTION C-C

SUBSTRUCTURE QUANTITY TABLE FOR BENT NO. 2		
ITEM		QUANTITY
Class A Excavation	cu. yard	245
Structural Steel Piles (12 in.)	linear foot	254
Pre-Bore for Piling	linear foot	734
Pile Point Reinforcement	each	4
Class B Concrete (Substructure)	cu. yard	127.0
Reinforcing Steel (Bridges)	pound	8560

Note: These quantities are included in the Estimated Quantities Table on Sheet No. 2.

Notes:

1. All vertical reinforcement bars in the substructure beams or caps shall be field adjusted to clear piles by at least 1 1/2".
2. All reinforcing bars in the tops of substructure beams or caps shall be spaced to clear anchor bolt walls for bearings by at least 1/2".
3. The contractor shall use one of the qualified resin anchor systems in accordance with Sec 1039.
4. Cost of furnishing and installing the resin anchor system complete in-place will be considered completely covered by the contract unit price for Class B Concrete (Substructure).
5. The minimum embedment depth in concrete with f'c = 4,000 psi for the resin anchor system shall be that required to meet the minimum ultimate pull out strength in accordance with Sec 1039 but shall not be less than 5". A #6 Grade 60 reinforcing bar 4'-3" long shall be substituted for the 1" Ø threaded rod. A #5 Grade 60 reinforcing bar 3'-0" (unless shown otherwise) long shall be substituted for the 3/4" threaded rod.
6. For locations of sections B-B and C-C, see Sheet No. 10.
7. For details of anchor bolt walls, see Sheet No. 14.

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 11 of 33

Revised 11/21/08

A21163

S:\Contractors\Comanche Construction 10\4-10 J4I1641D\Bridge dwgs\A21163 11 389 6.1B Bulletin 2 01.dgn 11-24-2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	12A

JOB NO. J4I1641D

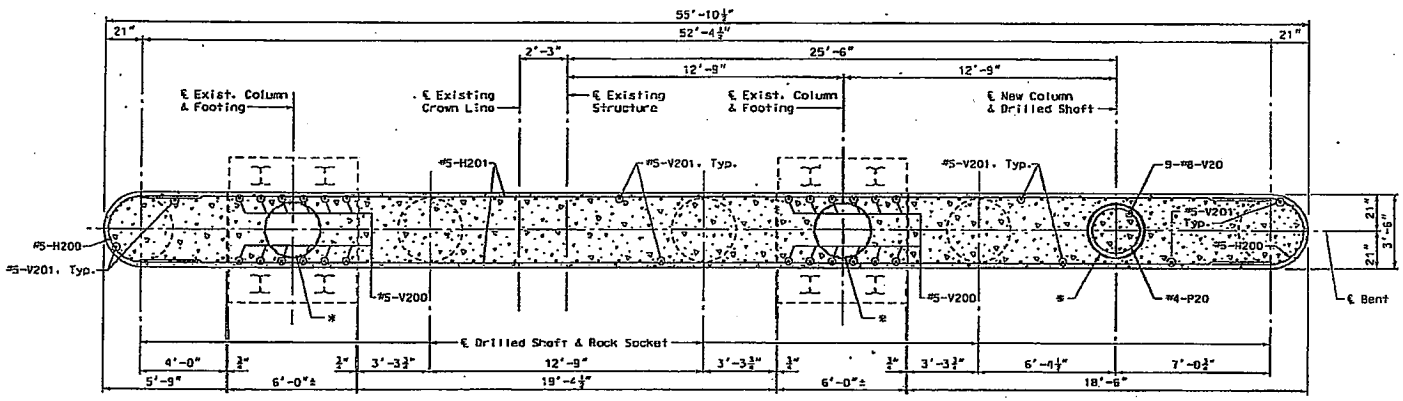
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

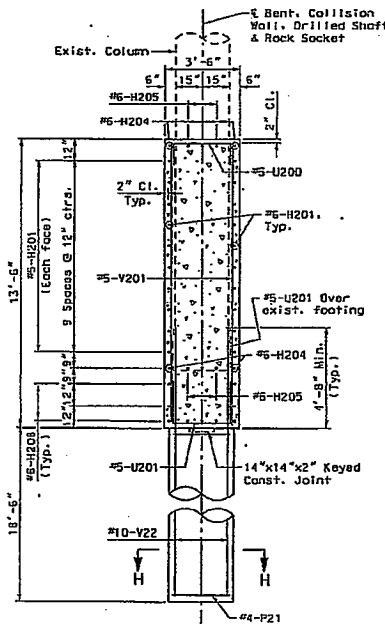
DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1500
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

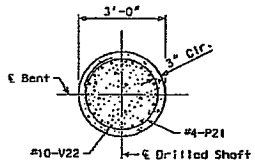


SECTION D-D

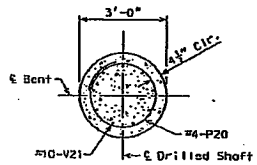
* ¾" Preformed joint filler. Seal around top with polyurethane joint sealant.



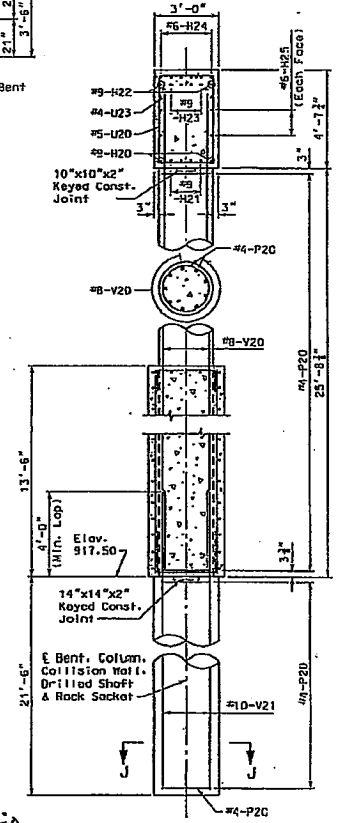
SECTION E-E



SECTION H-H



SECTION J-J



SECTION A-A
(Collision Wall reinforcing not shown for clarity, see Section E-E)

Note:
For location of Sections A-A, D-D and E-E, see Sheet No. 10A.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19517
PROFESSIONAL ENGINEER

Stephen A. Pellegrino
11-24-08

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 12A of 33

1 New sheet. Replaces sheet 12. 11/21/08

A21163 REV.

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ZONE	STATE	DISTRICT	SHEET NO.
1470	MO	4	12

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

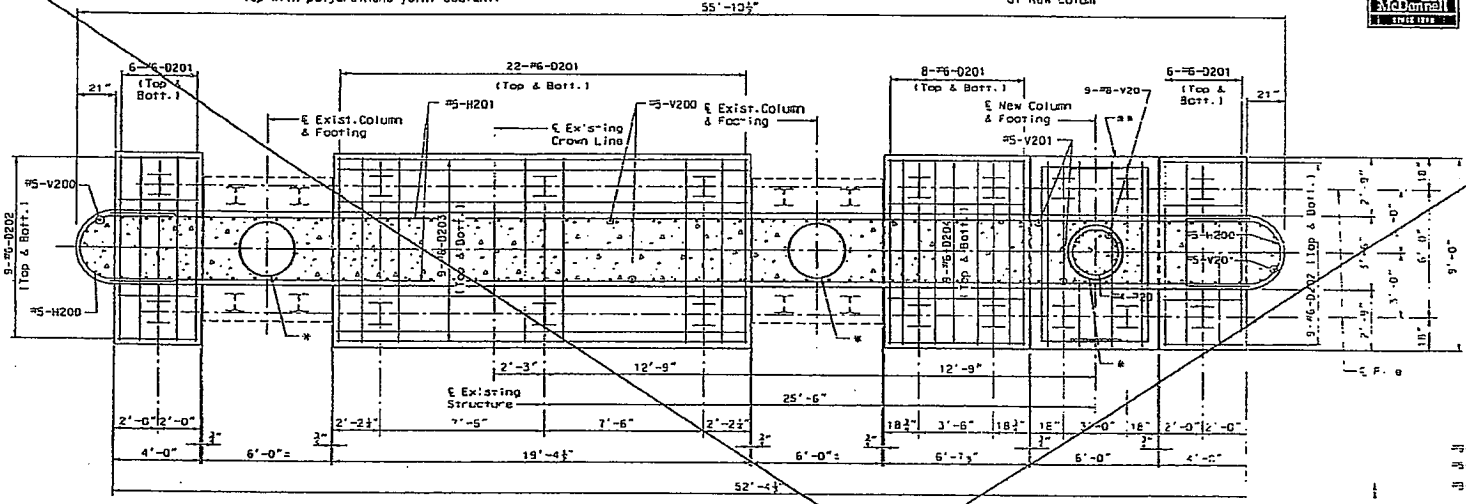
COUNTY JACKSON

DATE

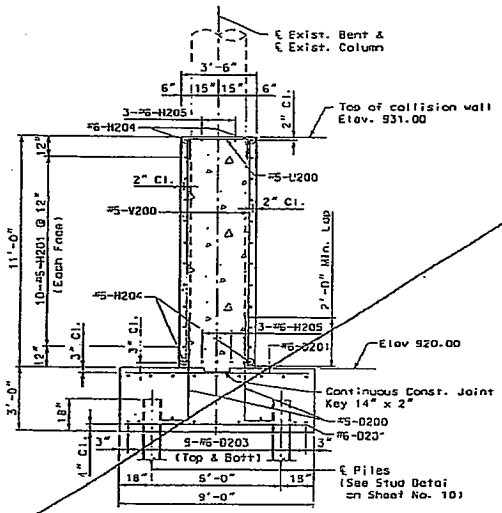
Burns & McDonnell

* 3/4" Preformed joint filler. Seal around top with polyurethane joint sealant.

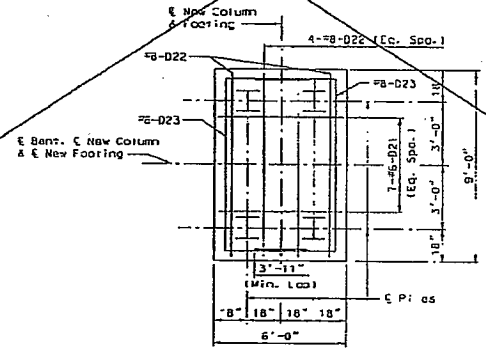
** See Plan of Footing at New Column



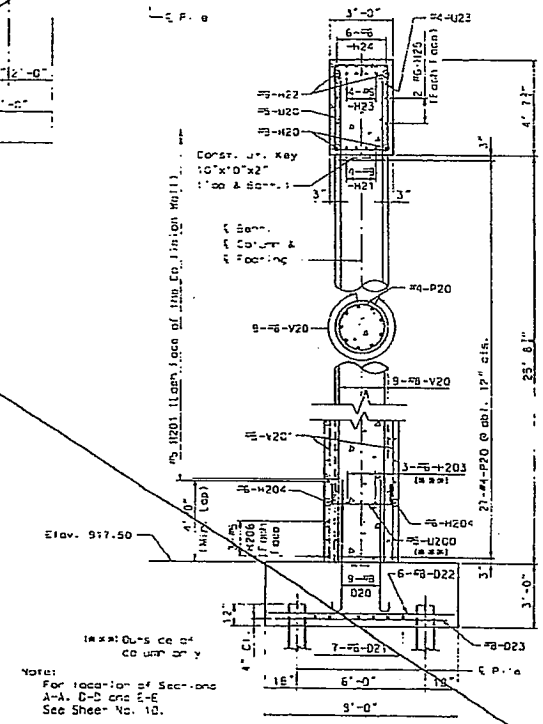
SECTION D-D



SECTION E-E



PLAN OF FOOTING AT NEW COLUMN



(**) Outside of column only

Note: For location of Sections A-A, D-D and E-E See Sheet No. 10.

SECTION A-A

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 12 of 33

Deleted 11/21/08

A21163

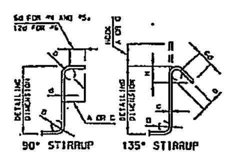
S:\Contractors\Cameron Construction\C 4 10\4 1641D\Bridge Deck Alternate 1 Bent 2 Drain Bldg.dgn

BILL OF REINFORCING STEEL

No. Req'd.	Size	Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	B ft. in.	C ft. in.	D ft. in.	E ft. in.	F ft. in.	H ft. in.	K ft. in.	Nominal Length ft. in.	Actual Length ft. in.	Weight lbs.
			SUBSTR																
			INT. BENT 2																
2	9	H20	BEAM		20		X			13 7.000							13 7	13 7	32
4	9	H21	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H22	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H23	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H24	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H25	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H26	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
27	5	H200	COLL. WALL		7		X			4 7.000	3 2.000						11 0	11 0	310
20	5	H201	COLL. WALL		20		X			52 5.000							52 5	52 5	1093
12	6	H202	COLL. WALL		20		X			5 10.000							5 10	5 10	105
6	6	H203	COLL. WALL		20		X			9 10.000							9 10	9 10	89
4	6	H204	COLL. WALL		20		X			52 5.000							52 5	52 5	315
6	6	H205	COLL. WALL		20		X			22 7.000							22 7	22 7	204
9	6	H206	COLL. WALL		20		X			16 8.000							16 8	16 8	225
3	6	H207	COLL. WALL		20		X			5 1.000							5 1	5 1	23
9	6	H208	COLL. WALL		20		X			19 2.000							19 2	19 2	259
3	6	H209	COLL. WALL		7		X			5 5.500	3 2.000						12 8	12 8	57
45	4	P20	COLUMN		16		X			2 3.000							9 0	9 0	295
35	4	P21	COL. / SHAFTS		16		X			2 6.000							9 10	9 10	624
9	5	U20	BEAM		13	S	X			2 5.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
6	5	U21	BEAM		13	S	X			2 3.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U22	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4	U23	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
47	5	U200	COLL. WALL		10	S	X				10.000	3 0.000					4 9	4 5	277
47	5	U201	COLL. WALL		10	S	X				2 0.000	3 0.000					7 3	6 10	335
9	8	V20	COLUMN		20		X			29 3.000							29 3	29 3	703
9	10	V21	DRILLED SHAFT		20		X			25 6.000							25 6	25 6	988
100	10	V22	DRILLED SHAFT		20		X			23 2.000							23 2	23 2	9,985
74	5	V200	COLL. WALL		20		X			10 7.000							10 7	10 7	265
42	5	V201	COLL. WALL		20		X			13 1.000							13 1	13 1	1,255
4	#5	V20	BEAM		22		X			18.000	9.125						26 1	26 1	18
			INT. BENT 3																
3	8	D30	COL. /FTG		17		X			7 0.000							7 11	7 11	190
13	5	D31	FOOTING		18		X			6 2.000							7 4	7 4	99
12	5	D32	FOOTING		18		X			6 2.000							7 4	7 4	92
2	9	H30	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H31	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H32	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H33	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H34	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H35	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H36	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52

BILL OF REINFORCING STEEL

No. Req'd.	Size	Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	B ft. in.	C ft. in.	D ft. in.	E ft. in.	F ft. in.	H ft. in.	K ft. in.	Nominal Length ft. in.	Actual Length ft. in.	Weight lbs.
28	4	P30	COLUMN		16		X			2 3.000							9 0	9 0	168
9	5	U30	BEAM		13	S	X			2 5.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
5	5	U31	BEAM		13	S	X			2 5.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U32	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4	U33	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
9	8	V30	COLUMN		20		X			30 8.000							30 8	30 8	737
4	#5	K30	BEAM		22		X			18.000	5.125						26 1	26 1	16
			INT. BENT 4																
9	4	D40	COL. /FTG		17		X			7 0.000							7 11	7 11	190
12	5	D41	FOOTING		18		X			5 8.000							6 10	6 10	86
11	5	D42	FOOTING		18		X			5 8.000							6 10	6 10	78
2	9	H40	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H41	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H42	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H43	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H44	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H45	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H46	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
21	4	P40	COLUMN		16		X			2 3.000							9 0	9 0	126
9	5	U40	BEAM		13	S	X			2 5.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
5	5	U41	BEAM		13	S	X			2 5.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U42	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4	U43	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
9	8	V40	COLUMN		20		X			23 4.000							23 4	23 4	561
4	#5	K40	BEAM		22		X			18.000	9.125						26 1	26 1	16
			SUPERSTR																
			END BENT 1																
8	6	H11	BEAM		18					11 8.000							13 0	13 0	156
4	6	H12	BEAM		20					11 8.000							11 8	11 8	70
8	6	H13	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H14	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H15	WING		20					10 6.000							10 6	10 6	95
2	6	H16	WING		20					9 8.000							9 8	9 8	29
2	6	H17	WING		20					4 4.000							4 4	4 4	13
2	6	H18	WING		20					2 4.000							2 4	2 4	7
2	6	Y11	WING		25					2 0.000	2 9.000	8 2.000			14.750	2 5.500	12 11	12 10	35
11	5	U11	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 8	10 4	119
4	4	U12	BEAM		10	S					2 7.500	2 3.000					7 6	7 4	20
15	4	U13	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 5	84
11	4	U14	DIAPHRAGM		19	S				3 6.000	21.000						5 3	5 2	38
13	4	U15	APP. HAUNCH		10	S					15.000	6.000					3 6	3 4	29
5	6	U16	DIAPHRAGM		19	S				5 0.000	21.000						6 3	6 7	49

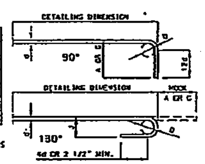


STIRRUP HOOK DIMENSIONS

GRADES 40 - 50 - 60 KSI

BAR SIZE	D (IN.)	90° HOOK: HOOK A OR C	135° HOOK: HOOK A OR C	135° HOOK: APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS

BAR SIZE	D (IN.)	ALL GRADES 180° HOOKS: A OR G	180° HOOKS: J	90° HOOKS: A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

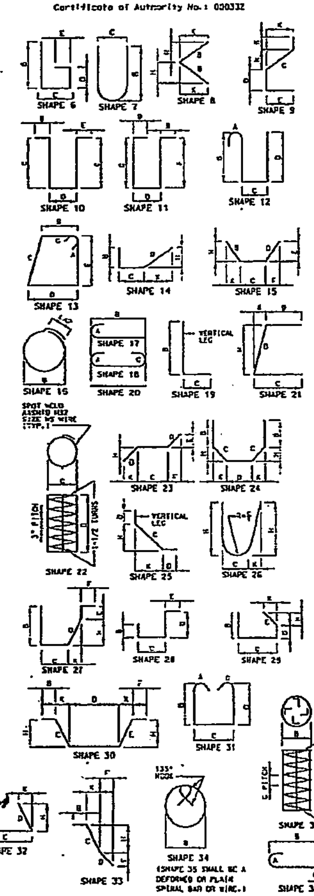
NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI — STEPHEN A. PELLEGRINO — NUMBER PE-19517 — REGISTERED PROFESSIONAL ENGINEER — 11-24-08

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	31A

JOB NO. J4I1641D
CONTRACT ID.
PROJECT NO.
COUNTY JACKSON
DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332



Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 31A of 33

⚠1 New sheet. Replaces sheet 31. 11/21/08

BENDING DIAGRAMS

A21163 REV.

S:\Contractors\Comanche Construction\1014-10\J4I1641D\Bridge dwgs\A21163\H & C Dwgs\31A-36916_EB_Bending-Diagrams-HC.dgn 11:27:06 AM 11/24/2008

ROUTE	STATE	DISTRICT	SHEET NO.
1470	MO	4	31

JOB NO. J4I1641D
CONTRACT ID.
PROJECT NO.
COUNTY JACKSON
DATE

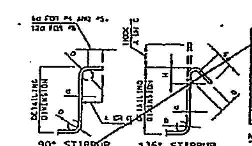
Burns & McDonnell

BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
			SUBSTR																
			INT. BENT 2																
5	8	D20	COL./FTG		17		X			7 0.000							7 11	7 11	150
7	6	D21	FOOTING		20		X			5 8.000							5 8	5 8	60
6	8	D22	FOOTING		20		X			8 8.000							8 8	8 8	139
2	8	D23	FOOTING		10		X				4 6.000	8 0.000					17 0	16 7	95
70	5	D200	COLL.WALL /FTG		13		X			4 10.000	10.000						5 8	5 7	403
84	6	D201	COLL.WALL FTG		20		X			8 8.000							8 8	8 8	1094
38	6	D202	COLL.WALL FTG		20		X			3 8.000							3 8	3 8	198
18	6	D203	COLL.WALL FTG		20		X			19 0.000							19 0	19 0	514
18	6	D204	COLL.WALL FTG		20		X			6 3.000							6 3	6 3	169
2	9	H20	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H21	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H22	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H23	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H24	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H25	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H26	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
27	5	H200	COLL. WALL		7		X			4 7.000	3 2.000						11 0	11 0	310
20	5	H201	COLL. WALL		20		X			52 3.000							52 5	52 5	1097
12	6	H202	COLL. WALL		20		X			5 10.000							5 10	5 10	105
6	6	H203	COLL. WALL		20		X			9 10.000							9 10	9 10	89
4	6	H204	COLL. WALL		20		X			52 3.000							52 5	52 5	315
6	6	H205	COLL. WALL		20		X			22 7.000							22 7	22 7	234
6	5	H206	COLL. WALL		20		X			12 2.000							12 2	12 2	26
27	4	P20	COLUMN		16		X			2 3.000							9 0	9 0	162
5	5	U20	BEAM		13	S	X			2 9.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
5	5	U21	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U22	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4	U23	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
55	5	U200	COLL.WALL		10	S	X				10.000	3 0.000					4 8	4 6	277
9	8	V20	COLUMN		20		X			29 3.000							29 3	29 3	703
31	5	V20C	COLL. WALL		20		X			10 7.000							10 7	10 7	1004
25	5	V201	COLL. WALL		20		X			13 1.000							13 1	13 1	341
4	5	Y20	BEAM		22		X			15.000	5.125						26 1	26 1	16
			INT. BENT 3																
9	8	D30	COL. /FTG		17		X			7 0.000							7 11	7 11	150
13	5	D31	FOOTING		18		X			6 2.000							7 4	7 4	95
12	5	D32	FOOTING		18		X			6 2.000							7 4	7 4	92
7	9	H30	BEAM		20		X			13 7.000							13 7	13 7	97
4	9	H31	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H32	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H33	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H34	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H35	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H36	BEAM		10	S	X				2 1.000	2 7.500					8 10	8 8	52

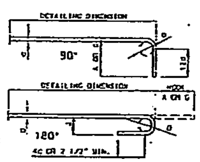
BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
28	4	P30	COLUMN		16		X			2 3.000							9 0	9 0	162
5	5	U30	BEAM		13	S	X			2 9.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
5	5	U31	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U32	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4	U33	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
9	8	V30	COLUMN		20		X			30 8.000							30 8	30 8	737
4	5	Y30	BEAM		22		X			18.000	9.125						26 1	26 1	18
			INT. BENT 4																
8	8	D40	COL. /FTG		17		X			7 0.000							7 11	7 11	150
12	5	D41	FOOTING		18		X			5 8.000							6 10	6 10	86
11	5	D42	FOOTING		18		X			5 8.000							6 10	6 10	78
2	9	H40	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H41	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H42	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H43	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H44	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H45	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H46	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
21	4	P40	COLUMN		16		X			2 3.000							9 0	9 0	126
9	5	U40	BEAM		13	S	X			2 9.000	4 7.000	2 9.000	4 7.000				14 9	14 5	135
5	5	U41	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5	U42	BEAM		10	S	X				4 2.000	2 9.000						13 11	23
3	4	U43	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
9	8	V40	COLUMN		20		X			23 4.000							23 4	23 4	561
4	5	Y40	BEAM		22		X			18.000	9.125						26 1	26 1	18
			SUPERSTR																
			END BENT 1																
8	6	H11	BEAM		18					11 8.000							12 0	13 0	156
4	6	H12	BEAM		20					11 8.000							11 8	11 8	70
6	6	H13	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H14	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H15	WING		20					10 6.000							10 6	10 6	95
2	6	H16	WING		20					9 8.000							9 8	9 8	29
2	6	H17	WING		20					4 4.000							4 4	4 4	13
2	6	H18	WING		20					2 4.000							2 4	2 4	7
2	6	I11	WING		25					2 0.000	7 9.000	8 2.000			14.750	2 5.500	12 11	12 10	39
11	5	U11	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 4	10 4	119
4	4	U12	BEAM		10	S					2 7.500	2 3.000					7 4	7 4	20
15	4	U13	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 6	84
11	4	U14	DIAPHRAGM		19	S				3 6.000	21.000						5 2	5 2	38
13	4	U15	APP. HAUNCH		10	S					18.000	6.000					3 6	3 4	32
5	6	U16	DIAPHRAGM		19	S				3 0.000	21.000						6 9	6 7	49



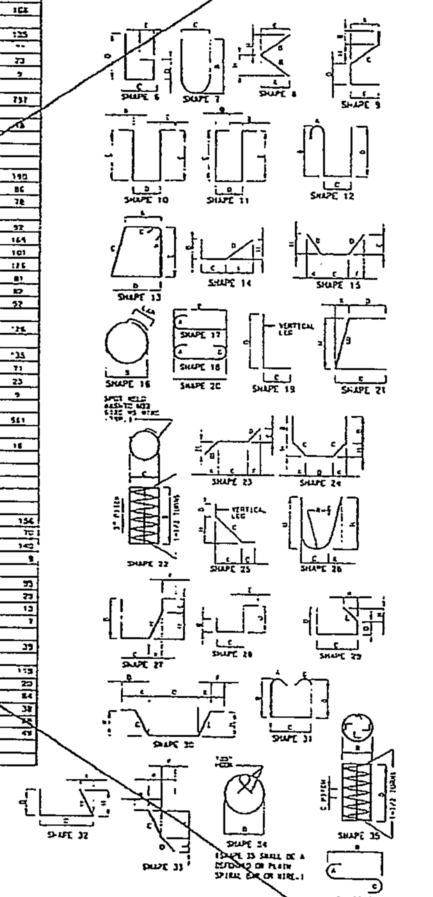
STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS: A OR G	180° HOOKS: J	90° HOOKS: A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYMENTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE ATTACHED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.



Detailed Feb. 2008
Checked Mar. 2009

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

Sheet No. 31 of 33

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BENDING DIAGRAMS

A21163

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	32A

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

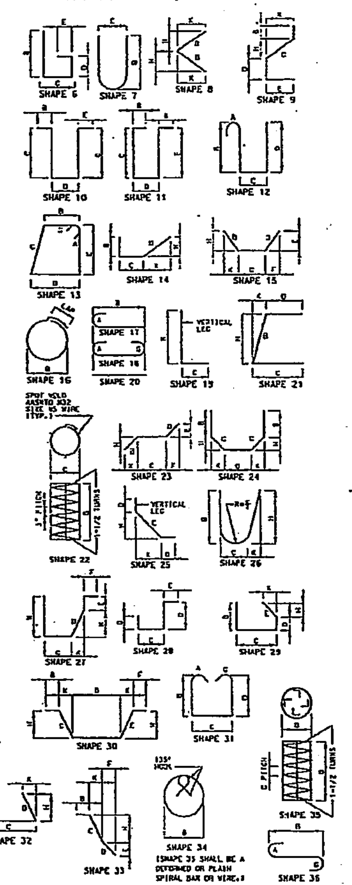
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

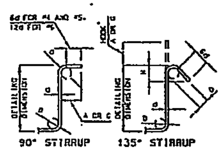
BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
16	6	V11	WING		20			V	2	5 4.000							5 8	5 8	
			INCREMENT =							2 2.000							2 2	2 2	94
			6.000 INCH																
2	6	V12	WING		20					6 1.000							6 1	6 1	18
2	6	V13	WING		20					8 9.000							8 9	8 9	26
			END BENT 5																
6	5	H51	BEAM		18					11 8.000							13 0	13 0	156
4	6	H52	BEAM		20					11 8.000							11 8	11 8	70
4	6	H53	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H54	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H55	WING		20					10 6.000							10 6	10 6	95
2	6	H56	WING		20					9 8.000							9 8	9 8	29
2	6	H57	WING		20					4 4.000							4 4	4 4	13
2	6	H58	WING		20					2 4.000							2 4	2 4	7
2	6	J51	WING		25					2 0.000	2 3.000	8 2.000			14.750	2 5.500	12 11	12 10	39
11	5	U51	BEAM		13	S				2 3.000	2 7.500	2 3.000	7 7.500				10 8	10 4	119
4	4	U52	BEAM		10	S					2 7.500	2 3.000					7 8	7 4	20
15	4	U53	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 5	84
11	4	U54	DIAPHRAGM		19	S				3 6.000	21.000						5 3	5 2	38
13	4	U55	APP. HAUNCH		10	S					18.000	8.000					3 6	3 4	25
5	6	U56	DIAPHRAGM		19	S				5 0.000	21.000						6 9	6 7	42
16	6	V51	WING		20			V	2	5 4.000							5 8	5 8	
			INCREMENT =							2 2.000							2 2	2 2	94
			6.000 INCH																
2	6	V52	WING		20					6 1.000							6 1	6 1	18
2	6	V53	WING		20					8 9.000							8 9	8 9	26
			SLAB																
411	5	S1	SLAB		20					14 2.000							14 2	14 2	6013
411	5	S2	SLAB		20					14 2.000							14 2	14 2	6013
76	5	S3	SLAB		20					53 2.000							53 2	53 2	4214
60	5	S4	SLAB		20					43 0.000							43 0	43 0	2691
66	6	S5	SLAB		20					34 0.000							34 0	34 0	3370
			BARRIER CURB																
212	5	R1	BARRIER CURB		26	S				2 6.000	4.250				2 6.000	3.000	5 3	5 3	1161
212	5	R3	BARRIER CURB		13	S				17.000	6.000						0 23	0 22	405
212	5	R4	BARRIER CURB		27	S					6.000	11.250	7.000	12.000	9.250	6.375	3 0	2 10	626
42	5	R5	BARRIER CURB		20					9 8.000							9 8	9 8	423
14	5	R6	BARRIER CURB		20					32 8.000							32 8	32 8	477
14	5	R7	BARRIER CURB		20					37 8.000							37 8	37 8	550
46	5	K1	BARRIER CURB		19	S				2 5.000	5.125						2 10	2 9	132
46	5	K2	BARRIER CURB		14	S				5.125	11.125	18.000			2.000	17.875	2 10	2 9	132
24	5	K3	BARRIER CURB		22	S				3 0.000	5.125	12.000	2 2.125		9.875	6.875	6 7	6 5	161
22	5	K4	BARRIER CURB		7					3 0.000	6.000						6 4	6 4	145
2	5	K5	BARRIER CURB		25	S				2 6.500	6.750	4.375			5.500	4.000	3 6	3 5	7
2	5	K6	BARRIER CURB		25	S				2 5.500	7.875	4.375			6.500	4.500	3 6	3 5	7
2	5	K7	BARRIER CURB		25	S				2 4.125	5.625	4.375			7.875	5.500	3 6	3 5	7
2	5	K8	BARRIER CURB		25	S				2 2.750	11.250	4.375			9.250	6.500	3 6	3 5	7
24	5	K9	BARRIER CURB		20					5 7.000							5 7	5 7	140
20	4	K10	BARRIER CURB		20					7 5.000							7 5	7 5	99

BILL OF REINFORCING STEEL

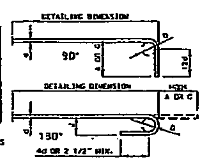
NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
2	5	K11	BARRIER CURB		8					2 2.125					2 2.000	2.375	4 4	4 4	9
			SLIP-FORM																
28	5	C1	SLIP-FORM		20					10 0.000							10 0	10 0	292
4	5	C2	SLIP-FORM		20					7 5.000							7 5	7 5	31
			TOTALS																
	4																		1699
	5																		28.576
	6																		6764
	8																		2361
	9																		1644
	10																		10.957
	WS																		54
			TOTAL																52.077
			Slab on Steel																
	4																		360
	5																		19.289
	6																		4842
			TOTAL																24.491
			Reinforcing Steel (Bridges)																
	4																		1240
	5																		4577
	6																		1922
	8																		2381
	9																		1644
	10																		10.957
	WS																		54
			TOTAL																22.775
			Safety Barrier Curb																
	4																		99
	5																		4339
			TOTAL																4438
			Slip-Form Option																
	5																		323
			TOTAL																323





STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK A OR C	135° HOOK A OR C	135° HOOK APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-18517
REGISTERED PROFESSIONAL ENGINEER

Stephen Pellegrino
11-24-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 32A of 33

△1 New sheet. Replaces sheet 32. 11/21/08

BENDING DIAGRAMS

A21163

REV.

ROUTE	STATE	DISTRICT	SHEET NO.
470	MO	4	32A

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

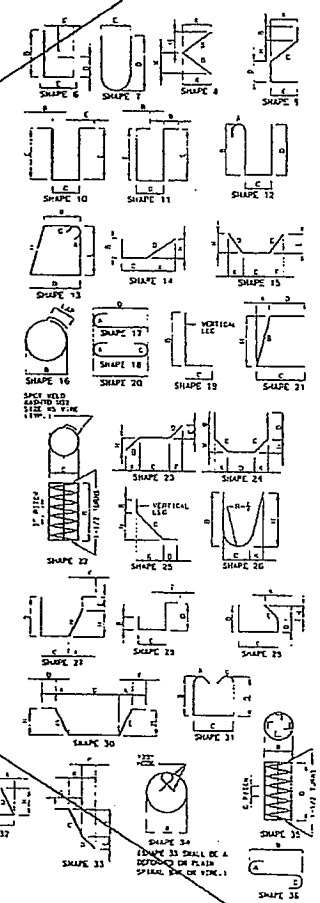
DATE

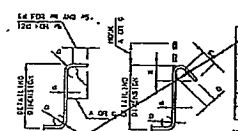
BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
16	5	V11	WING		20			V	2	5 8.000							5 8	5 8	
			INCREMENT = 6.000 INCH							2 2.000							2 2	2 2	54
7	5	V12	WING		20					6 1.000							6 1	6 1	13
2	5	V13	WING		20					8 9.000							8 9	8 9	26
			END BENT 5																
8	5	H51	BEAM		18					13 8.000							13 0	13 0	156
4	5	H52	BEAM		20					11 8.000							11 8	11 8	70
8	5	H53	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	5	H54	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	5	H55	WING		20					10 6.000							10 6	10 6	55
2	5	H56	WING		20					9 8.000							9 8	9 8	25
2	5	H57	WING		20					4 4.000							4 4	4 4	13
2	4	H58	WING		20					2 4.000							2 4	2 4	7
2	5	T51	WING		25					2 0.000	2 9.000	8 2.000			14.750	2 3.500	12 11	12 10	33
11	5	U51	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 4	10 4	119
4	4	U52	BEAM		10	S					2 7.500	2 3.000					7 6	7 4	40
15	4	U53	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 5	84
11	4	U54	DIAPHRAGM		19	S				3 6.000	27.000						5 3	5 2	38
13	4	U55	APP. HAUNCH		10	S					18.000	6.000					3 6	3 4	23
5	5	U56	DIAPHRAGM		19	S				5 0.000	27.000						6 3	6 7	43
16	5	V51	WING		20			V	2	5 8.000							5 8	5 8	
			INCREMENT = 6.000 INCH							2 2.000							2 2	2 2	54
7	5	V52	WING		20					6 1.000							6 1	6 1	13
2	5	V53	WING		20					8 9.000							8 9	8 9	26
			SLAB																
411	5	S1	SLAB		20					14 2.000							14 2	14 2	6073
411	5	S2	SLAB		20					14 2.000							14 2	14 2	6073
76	5	S3	SLAB		20					53 2.000							53 2	53 2	4214
60	5	S4	SLAB		20					43 0.000							43 0	43 0	2691
66	5	S5	SLAB		20					34 0.000							34 0	34 0	3510
			BARRIER CURB																
212	5	R1	BARRIER CURB		26	S				2 6.000	4.250				2 6.000	3.000	5 3	5 3	1157
212	5	R3	BARRIER CURB		19	S				37.000	6.000						8 23	8 22	405
212	5	R4	BARRIER CURB		27	S					6.000	11.250	7.000	12.000	3.333	6.375	3 0	2 10	828
42	5	R5	BARRIER CURB		20					9 8.000							9 8	9 8	423
14	5	R6	BARRIER CURB		20					32 8.000							32 8	32 8	477
14	5	R7	BARRIER CURB		20					37 8.000							37 8	37 8	550
46	5	K1	BARRIER CURB		19	S				2 5.000	5.125						2 10	2 9	132
46	5	K2	BARRIER CURB		14	S				5.125	11.125	18.000			2.000	17.875	2 10	2 9	132
24	5	K3	BARRIER CURB		27	S				3 0.000	5.125	12.000	2 2.125		9.625	2.875	4 7	4 5	"C"
22	5	K4	BARRIER CURB		7					3 0.000	6.000						6 4	6 4	145
2	5	K5	BARRIER CURB		25	S				2 6.500	6.750	4.375			5.500	4.000	3 6	3 5	7
2	5	K6	BARRIER CURB		25	S				2 5.500	7.875	4.375			6.500	4.500	3 6	3 5	7
2	5	K7	BARRIER CURB		25	S				2 4.125	9.625	4.375			7.875	5.500	3 6	3 5	7
2	5	K8	BARRIER CURB		25	S				2 2.750	11.250	4.375			9.250	6.500	3 6	3 5	7
24	5	K9	BARRIER CURB		20					5 7.000							5 7	5 7	140
20	4	K10	BARRIER CURB		20					7 5.000							7 5	7 5	93

BILL OF REINFORCING STEEL

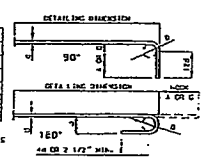
NO. REQ'D.	MARK NO. SIZE	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
2	5	K11	BARRIER CURB		8					2 2.125					2 2.000	2.375	4 4	4 4	9
			SLIP-FORM																
28	5	C1	SLIP-FORM		20					10 0.000							10 0	10 0	257
4	5	C2	SLIP-FORM		20					7 5.000							7 5	7 5	91
			TOTALS																
	4																		
	5																		
	6																		
	8																		
	9																		
	V5																		
			TOTAL																
			Sign on Steel																
	4																		
	5																		
	6																		
			TOTAL																
			Reinforcing Steel (Epoxied)																
	4																		
	5																		
	6																		
	8																		
	9																		
	V5																		
			TOTAL																
			Safety Screen Posts																
	4																		
	5																		
			TOTAL																
			Slip-Form Option																
	5																		
			TOTAL																





STIRRUP HOOK DIMENSIONS (GRADES 40 - 50 - 60 KSI)				
BAR SIZE	D (IN.)	90° HOOK	135° HOOK	
		HOOK A OR C	HOOK A OR C	EXTENSION
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR B	J	A OR B
#3	2 1/4"	3"	3"	6"
#4	3"	4"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	7 1/2"	15"	11 3/4"	19"
#10	8 3/4"	13"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	14 1/4"	2'-3"	21 3/4"	2'-3"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE 90 DEGREE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
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REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 32 of 33

Revised 12/2/08

BENDING DIAGRAMS

A21163

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	33A

JOB NO. J4I1641D

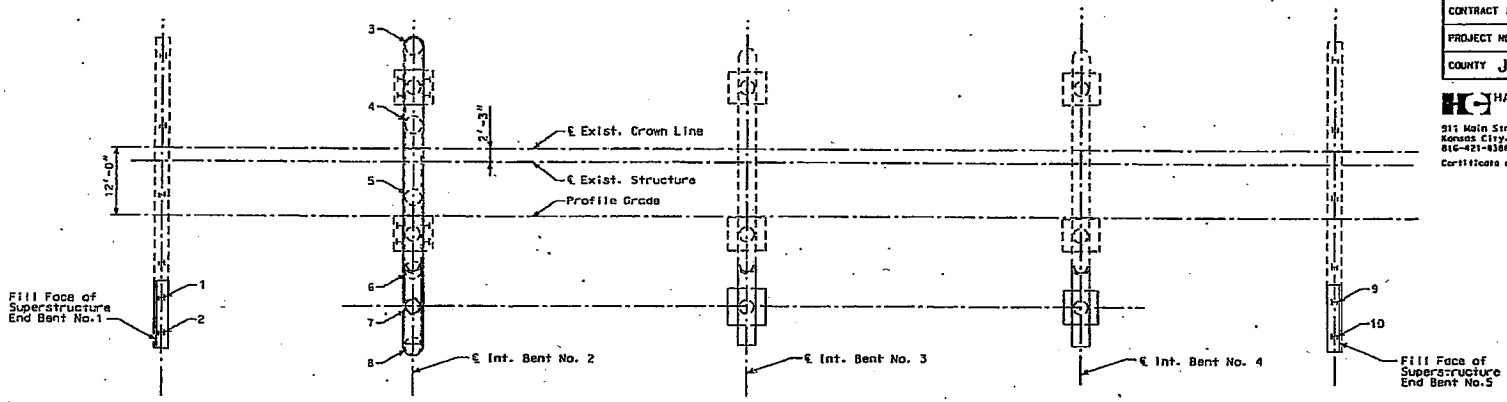
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-4386
Certificate of Authority No.: 000332



PART PLAN SHOWING
PILE NUMBERING FOR RECORDING
"AS BUILT PILE" DATA

"AS BUILT PILE" DATA

END BENT NO. 1 (HP10x42)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
1			
2			

INT. BENT NO. 2 (3'-0"Ø DRILLED SHAFTS)

SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
3			
4			
5			
6			
7			
8			

END BENT NO. 5 (HP10x42)

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
9			
10			

NOTE: INDICATE IN REMARKS COLUMN:
A.) IF PILING WERE DRIVEN TO PRACTICAL REFUSAL.
B.) PILE BATTER IF OTHER THAN SHOWN ON BENT DETAIL SHEET.
C.) TYPE OF PILING USED.

NOTE: THIS SHEET TO BE COMPLETED BY MoDOT CONSTRUCTION PERSONNEL.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19191
REGISTERED PROFESSIONAL ENGINEER

Stephen Pellegrino
11-24-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 33A of 33

△1 New sheet. Replaces sheet 33. 11/21/08

A21163

REV.

S:\Contractors\Comanche Construction\I01-10\J4I1641D\Bridge dwgs\A21163\H & C Dwgs\33A-38916_EB_Pile-Data-HC.dgn 9:47:01 AM 11/24/2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	33

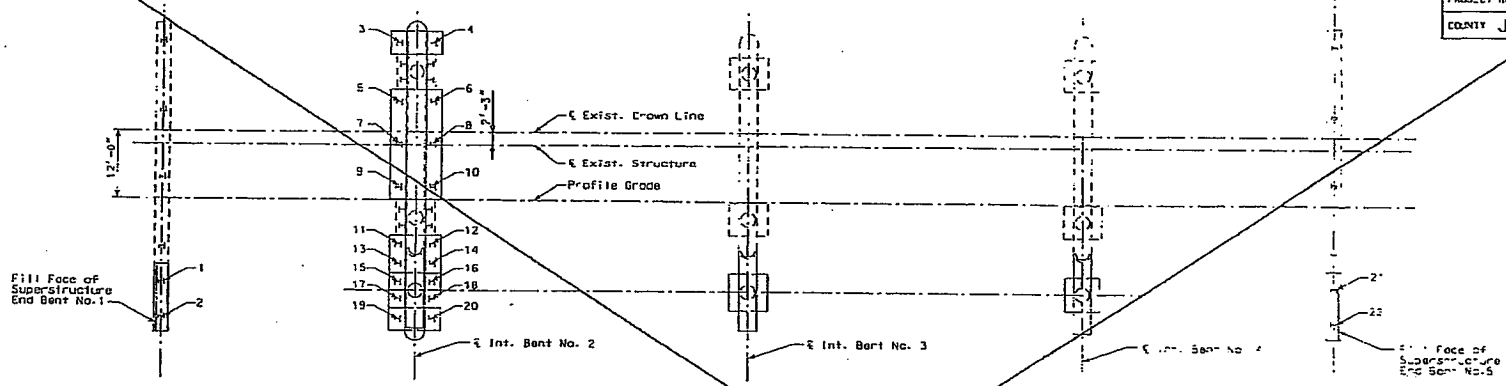
JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE



PART PLAN SHOWING
PILE NUMBERING FOR RECORDING
"AS BUILT PILE" DATA

"AS BUILT PILE" DATA

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
			END BENT NO. 1
1			
2			
			INT. BENT NO. 2
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
			END BENT NO. 5
21			
22			

NOTE: INDICATE IN REMARKS COLUMN:
A. IF PILING WERE DRIVEN TO PRACTICAL REFUSAL.
B. PILE BATTER IN OTHER THAN SHOWN ON BENT DETAIL SHEET.
C. TYPE OF PILING USED.

NOTE: THIS SHEET TO BE COMPLETED BY MoDOT CONSTRUCTION PERSONNEL.

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 33 of 33

Revised 11/21/08

A21163

REV.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

WIDEN EXISTING (44'-58'-58'-44') CONT. COMPOSITE I-BEAM SPANS

ROUTE	STATE	DISTRICT	SHEET NO.
I-470	MO	4	1A

JOB NO. J4I1641D

CONTRACT ID.

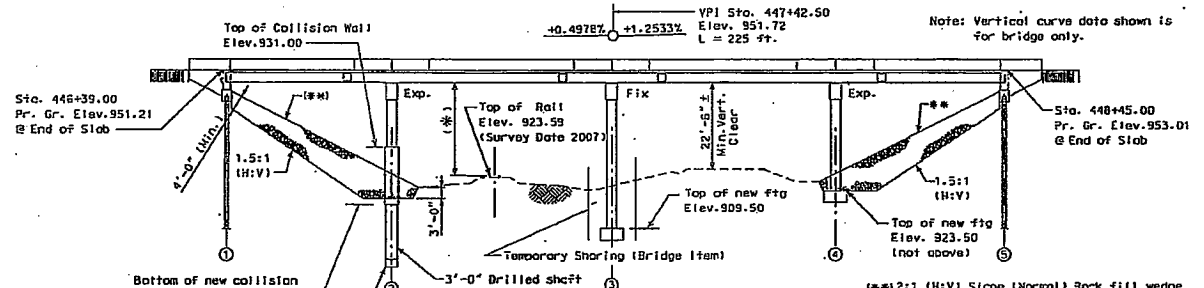
PROJECT NO.

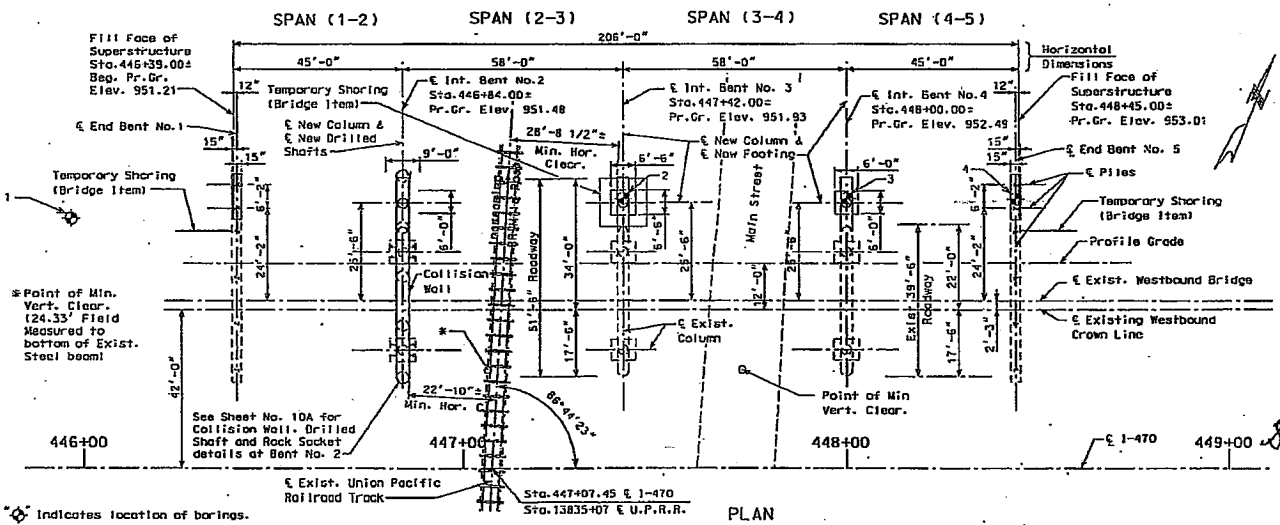
COUNTY JACKSON DATE

SEC/SUR 36 TWP 48N RGE 32W

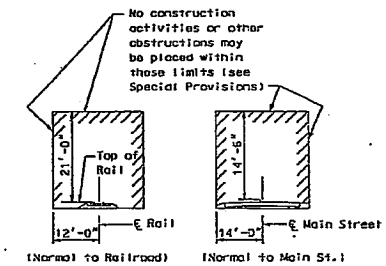
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1500
Kansas City, Missouri 64105
816-421-9385
Certificate of Authority No.: 000332

(***) See Sheet No. 10A for elevations of Drilled Shafts and Rock Sockets.





PLAN



MINIMUM CONSTRUCTION CLEARANCES

(Not to scale)

"◇" Indicates location of borings.

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 Sheets No. 3 and 4. 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 any other documentation not expressly warranted, which the contractor may obtain from the Commission.

Designed Feb. 2008
Detailed Feb. 2008
Checked Mar. 2008

Notes:

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 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

(*) Final vertical clearance from top of rails to bottom of superstructure shall be at least 23'-4". Track elevations should be verified in the field prior to construction to determine if the final vertical clearance shown will be obtained.

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

STATE OF MISSOURI
STEPHEN A. FELLGRINO
NUMBER PE-19570
PROFESSIONAL ENGINEER
11-26-08

This set of Plans is for Revisions made by Harrington & Cortelyou, Inc. to Bent 2 only. Other information from the Contract Plans has not been checked by Harrington & Cortelyou, Inc.

BM #15-E.
FOUND CHISELED PLUS ON THE WEST END OF THE SOUTH HUB GUARD OF BRIDGE OVER MAIN STREET AND RAIL ROAD TRACKS OF THE EASTBOUND LANE OF I-470.
ELEVATION = 953.55' I-470 STATION 446+29.87, 65.01' RT

WIDEN EXISTING BRIDGE OVER UNION PAC. R.R. & MAIN STREET

STATE ROAD FROM RTE. 50 TO DOUGLAS ST.

ABOUT 1 MILE E. OF RTE. 50

STA.446+39.00

STD.617.10

STD.706.35

A21164

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

Sheet No.- 1A of 34

1 New sheet. Replaces sheet 1. 11/21/08

REV.

S:\Contractors\Comanche Construction\1014-10\J4I1641D\Bridge dwgs\A21164\H & C Dwgs\34A-38916_WB_Plan+elev.dgn 3:23:07 PM 11/26/2008

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

WIDEN EXISTING (44'-58'-58'-44') CONT. COMPOSITE I-BEAM SPANS

Burns & McDonnell

PAGE	STATE	SUBPART	SHEET NO.
1470	MO	4	1

JOB NO. J411641D

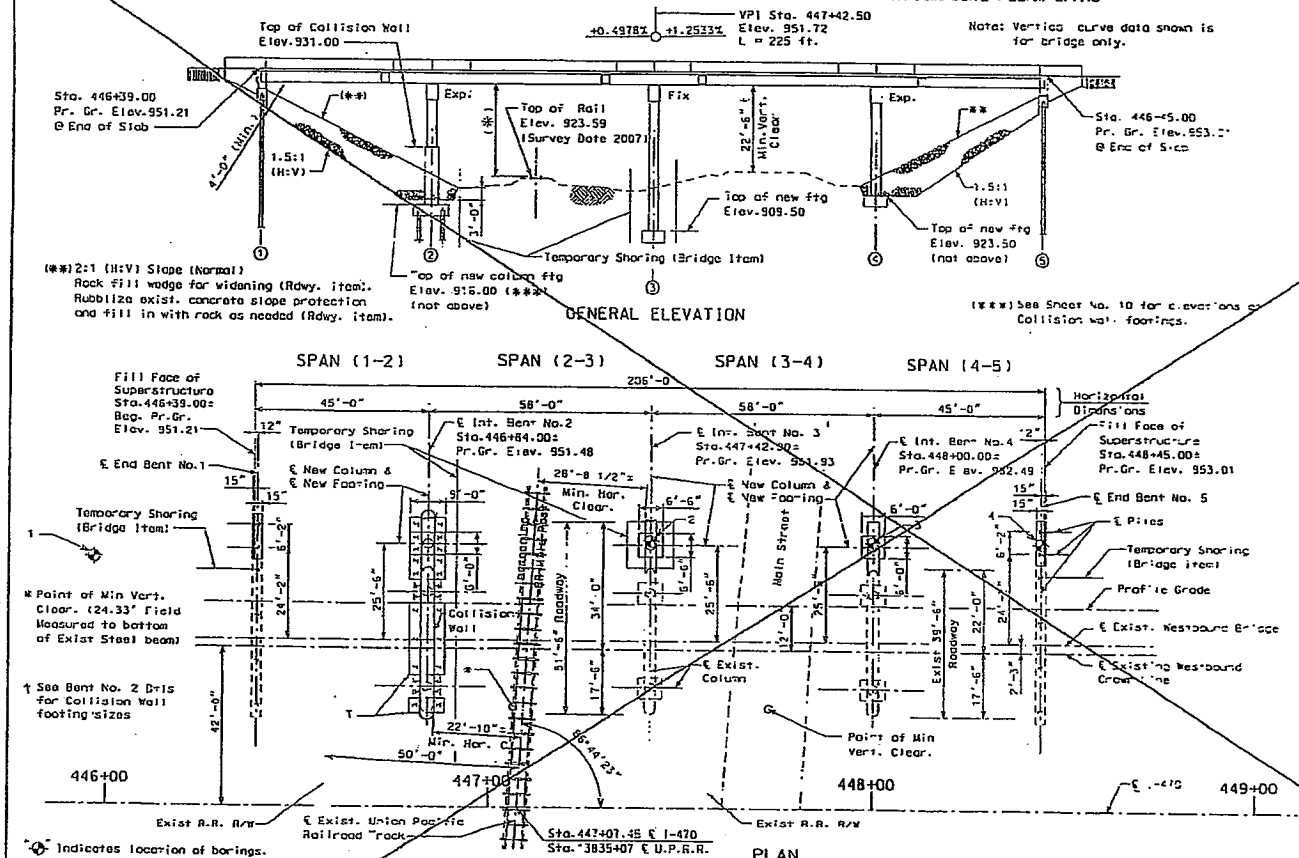
CONTRACT ID.

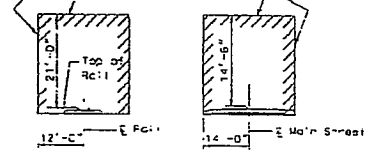
PROJECT NO.

COUNTY JACKSON

DATE

SEC/SUR 36 TWP 48N RGE 32W





MINIMUM CONSTRUCTION CLEARANCES

(Not to scale)

"◊" Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

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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 any other documentation not expressly warranted, which the contractor may obtain from the Commission.

Designed Feb. 2008
Detailed Feb. 2008
Checked Mar. 2008

Notes:

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 feet in back of the fill face of the end bents before any piles are driven for any bents falling within the embankment section.

(*) Final vertical clearance from top of rails to bottom of superstructure shall be at least 23'-4". Track elevations should be verified in the field prior to construction to determine if the final vertical clearance shown will be obtained.

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

BM #15-E.
FOUND CHISELED PLUS ON THE WEST END OF THE SOUTH HUB GUARD OF BRIDGE OVER MAIN STREET AND RAIL ROAD TRACKS OF THE EASTBOUND LANE OF I-470.
ELEVATION = 953.55' I-470 STATION 446+29.87, 65.01' RT

WIDEN EXISTING BRIDGE OVER UNION PAC. R.R. & MAIN STREET

STATE ROAD FROM RTE. 50 TO DOUGLAS ST.

ABOUT 1 MILE E. OF RTE. 50

STA.446+39.00

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

STO.617.10

STO.706.35

A21164

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	2A

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1500
Kansas City, Missouri 64105
816-421-6386
Certificate of Authority No.: 000332

ESTIMATED QUANTITIES

ITEM		SUBSTR.	SUPERSTR.	TOTAL
Class 1 Excavation	cu. yard	204		204
Temporary Shoring	lump sum			1
Removal of Concrete Wearing Surface	sq. foot		7931	7931
Partial Removal of Existing Bridge Decks	sq. foot		490	490
Partial Removal of Substructure Concrete	lump sum			1
Low Slump Concrete Wearing Surface	sq. yard		893	893
Drilled Shafts (3'-0" Dia.)	linear foot	84		84
Rock Sockets (3'-0" Dia.)	linear foot	21		21
Foundation Inspection Holes	linear foot	81		81
Concrete Coring	linear foot	21		21
Structural Steel Piles (10 in.)	linear foot	124		124
Pre-Bore for Piling	linear foot	38		38
Pile Point Reinforcement	each	4		4
Class B Concrete (Substructure)	cu. yard	143.4		143.4
Slab on Steel	sq. yard		328	328
* Safety Barrier Curb	linear foot		224	224
Substructure Repair (Formed)	sq. foot	120		120
Reinforcing Steel (Bridges)	pound	23,120		23,120
Conduit System on Structure	lump sum			1
Fabricated Structural Carbon Steel (I-Beam)	pound		3970	3970
Fabricated Structural Low Alloy Steel (I-Beam)A709, Grade 50	pound		51,750	51,750
Slab Drain	each		4	4
Surface Preparation for Recoating Structural Steel	sq. foot		8200	8200
Field Application of Inorganic Zinc Primer	sq. foot		8200	8200
Intermediate Field Coat (System G)	sq. foot		11,000	11,000
Finish Field Coat (System G)	sq. foot		1700	1700
Laminated Neoprene Bearing Pad Assembly	each		6	6

Notes:
* Safety barrier curb shall be cast-in-place option or slip-form option.

All concrete between the upper and lower construction joints in the end bents is included in the Estimated Quantities for Slab on Steel.

All concrete for the collision wall is included in the quantity for Class B Concrete (Substructure). All reinforcement for the collision wall is included in the quantity for Reinforcing Steel (Bridges).

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Steel.

Estimated Quantities for Slab on Steel

ITEM		TOTAL
Class B-2 Concrete	cu. yard	90.7
Reinforcing Steel	pound	24,490

The table of Estimated Quantities for Slab on Steel represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for forms, all concrete and reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities, but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II, or III.

Slab shall be cast-in-place with conventional forming. Stay-in-place corrugated metal forms or precast prestressed panels will not be permitted.

General Notes:

Design Specifications:
2002 - AASHTO 17th Edition
Load Factor Design
Seismic Performance Category A
Acceleration Coefficient = 0.04
Bridge Deck Rating = 7

Design Loading:
HS20-44
15 #/Sq. Ft. Future Wearing Surface
Military 24,000 # Tandem Axle
Earth - 120 #/Cu. Ft.. Equivalent Fluid Pressure 45 #/Cu. Ft.
Fatigue Stress - Case 1

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-1 Concrete (Safety Barrier Curb)	f'c = 4,000 psi
Class B-2 Concrete (Superstructure, except Safety Barrier Curb)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Carbon Steel (ASTM A709 Grade 36)	fy = 36,000 psi
Structural Steel (ASTM A709 Grade 50)	fy = 50,000 psi
Steel Pile (ASTM A709 Grade 36) fb = 9,000 psi.	fy = 36,000 psi

Fabricated Steel Connections:
Field connections shall be made with 3/4" diameter high strength bolts and 13/16" diameter holes, except as noted.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Structural Steel Protective Coatings:
Protective Coating: System G in accordance with Sec 1081.
Surface Preparation: Surface preparation of the existing steel shall be in accordance with Sec 1081 for "Recoating of Structural Steel (System G or H)". The cost of surface preparation will be considered completely covered by the contract unit price per sq. foot for "Surface Preparation for Recoating Structural Steel".

Prime Coat: The cost of the prime coat for the existing steel will be considered completely covered by the contract unit price per sq. foot for "Field Application of Inorganic Zinc Primer". The cost of the prime coat for new steel will be considered completely covered by the contract unit price for the Fabricated Structural Steel.

Field Coat: The color of the finish field coat shall be Gray (Federal Standard #26373). The cost of the intermediate field coat will be considered completely covered by the contract unit price per sq. foot for "Intermediate Field Coat (System G)". The cost of the finish field coat will be considered completely covered by the contract unit price per sq. foot for "Finish Field Coat (System G)."

At the option of the contractor, the intermediate and finish field coats for new steel may be applied in the shop. The contractor shall exercise extreme care during all phases of loading, hauling, handling, erection and pouring of the slab to minimize damage and shall be fully responsible for all repairs and cleaning of the coating systems as required by the engineer.

** Piles for Bent No. 2 collision wall do not require driving. These piles shall be centered in oversized prebored holes with minimum diameter of 2'-0" and shall be backfilled with concrete to top of rock. Minimum socket into competent rock shall be 3'-0". Concrete shall have a minimum strength at 28 days of 4000 psi, a min. slump at placement of 5"(+/- 1") and maximum aggregate size of 3/8". Fill all void space above concrete with sand per Sec 702.4.3, or at contractor's option, backfill with concrete as indicated to extend to the bottom of collision wall footing.

General Notes (Cont.):

Miscellaneous:
Traffic over structure to be maintained during construction. See Roadway plans for traffic control.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Sec 106 and Field Section (FS-712) from Materials Manual.

"Sec" refers to the sections in the standard and supplemental specifications unless specified otherwise.

Repair of Concrete Deck (Half- Soling):

Payment for repair of concrete deck (half-soling) for a maximum quantity of 50 square feet will be considered completely covered by the contract unit price for the Low Slump Concrete Wearing Surface. If the quantity of half-soling is greater than 50 square feet, payment for the amount in excess of 50 square feet will be paid for in accordance with Sec 104.3.

Revised Structures:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field before ordering new material.

Bars bonded in old concrete not removed shall be cleanly stripped and embedded into new concrete where possible. If length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and not covered with new concrete shall be coated with an approved qualified special mortar in accordance with Sec 704.

In order to maintain grade and a minimum thickness of overlay as shown on plans it may be necessary to use additional quantities of overlay at various locations throughout the structure. The cost of furnishing and installing the overlay will be considered completely covered in the contract unit price, including all additional labor, materials or equipment for variations in thickness of overlay.

Longitudinal dimensions are based on the orginal design plans.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-2001
PROFESSIONAL ENGINEER
11-25-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 2A of 34

1 New sheet. Replaces sheet 2. 11/21/08

A21164

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	2

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

ESTIMATED QUANTITIES

	ITEM		SUBSTR.	SUPERSTR.	TOTAL
	Class 1 Excavation	cu. yard	325		325
	Temporary Shoring	lump sum			1
	Removal Of Concrete Wearing Surface	sq. foot		7931	7931
	Partial Removal of Existing Bridge Decks	sq. foot		490	490
	Partial Removal of Substructure Concrete	lump sum			1
	Low Slump Concrete Wearing Surface	sq. yard		893	893
	Structural Steel Piles (10 in.)	linear foot	124		124
	Structural Steel Piles (12 in.)	linear foot	264		264
	Pre-Bore for Piling	linear foot	264		264
	Pile Point Reinforcement	each	8		8
	Class B Concrete (Substructure)	cu. yard	167.0		167.0
	Slab on Steel	sq. yard		328	328
*	Safety Barrier Curb	linear foot		224	224
	Substructure Repair (Formed)	sq. foot	120		120
	Reinforcing Steel (Bridges)	pound	13,720		13,720
	Conduit System on Structure	lump sum			1
	Fabricated Structural Carbon Steel (I-Beam)	pound		3970	3970
	Fabricated Structural Low Alloy Steel (I-Beam)A709, Grade 50	pound		51,750	51,750
	Slab Drain	each		4	4
	Surface Preparation for Recoating Structural Steel	sq. foot		8200	8200
	Field Application of Inorganic Zinc Primer	sq. foot		8200	8200
	Intermediate Field Coat (System G)	sq. foot		11,000	11,000
	Finish Field Coat (System G)	sq. foot		1700	1700
	Laminated Neoprene Bearing Pad Assembly	each		6	6

Notes:

* Safety barrier curb shall be cast-in-place option or slip-form option.

All concrete between the upper and lower construction joints in the end bents is included in the Estimated Quantities for Slab on Steel.

All concrete for the collision wall is included in the quantity for Class B Concrete (Substructure). All reinforcement for the collision wall is included in the quantity for Reinforcing Steel (Bridges).

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Steel.

Estimated Quantities for Slab on Steel

ITEM		TOTAL
Class B-2 Concrete	cu. yard	90.7
Reinforcing Steel	pound	24,490

The table of Estimated Quantities for Slab on Steel represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for forms, all concrete and reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II, or III.

Slab shall be cast-in-place with conventional forming. Stay-in-place corrugated metal forms or precast prestressed panels will not be permitted.

Footing & Pile Data

	Bent No.		1	2 (Coll. Wall)	2 (Column)	3	4	5
Bearing Pile	Pile Type and Size		HP10 X 42	HP12 X 53	HP12 X 53			HP10 X 42
	Number		2	14	4			2
	Approximate Length	feet	41	12015.2812*	12			21
	Design Bearing	kip	85	51	95			85
	Hammer Energy Required	foot-pound	12,600	**	13,750			12,650
Spread Footings	Foundation Material					Limestone	Shale	
	Design Bearing	kip/sq. foot				10	10	

Minimum energy requirement of hammer is based on plan length and design bearing value of piles.
All piles, except for Bent No. 2 collision wall, shall be driven to practical refusal.
Prebore for piles at Bent No. 2 to elevation 902.5.
Prebore for piles at Bent No. 5 to elevation 927.00.
Backfill all prebored piles in accordance with Sec 702.4.3.
Manufactured pile point reinforcement shall be used on all driven piles in this structure.

Detailed Feb. 2002
Checked Mar. 2002

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

General Notes:

Design Specifications:
2002 - AASHTO 17th Edition
Load Factor Design
Seismic Performance Category A
Acceleration Coefficient = 0.04
Bridge Deck Rating = 7

Design Loading:
HS20-44
15 #/Sq. Ft. Future Wearing Surface
Military 24,000 # Tandem Axle
Earth - 120 #/Cu. Ft., Equivalent Fluid Pressure 45 #/Cu. Ft.
Fatigue Stress - Case I

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 3,000 psi
Class B-1 Concrete (Safety Barrier Curb)	f'c = 4,000 psi
Class B-2 Concrete (Superstructure, except Safety Barrier Curb)	f'c = 4,000 psi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Carbon Steel (ASTM A709 Grade 36)	fy = 36,000 psi
Structural Steel (ASTM A709 Grade 50)	fy = 50,000 psi
Steel Pile (ASTM A709 Grade 35) fb = 9,000 psi, fy = 36,000 psi	

Fabricated Steel Connections:
Field connections shall be made with 3/4" diameter high strength bolts and 13/16" diameter holes except as noted.

Joint Filler:
All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

Structural Steel Protective Coatings:
Protective Coating: System G in accordance with Sec 1081.
Surface Preparation: Surface preparation of the existing steel shall be in accordance with Sec 1081 for "Recoating of Structural Steel (System G or H)". The cost of surface preparation will be considered completely covered by the contract unit price per sq. foot for "Surface Preparation for Recoating Structural Steel".

Prime Coat: The cost of the prime coat for the existing steel will be considered completely covered by the contract unit price per sq. foot for "Field Application of Inorganic Zinc Primer". The cost of the prime coat for new steel will be considered completely covered by the contract unit price for the Fabricated Structural Steel.

Field Coat: The color of the finish field coat shall be Gray (Federal Standard #26373). The cost of the intermediate and finish field coats will be considered completely covered by the contract unit price per sq. foot for "Intermediate Field Coat (System G)". The cost of the finish field coat will be considered completely covered by the contract unit price per sq. foot for "Finish Field Coat (System G)."

At the option of the contractor, the intermediate and finish field coats for new steel may be applied in the shop. The contractor shall exercise extreme care during all phases of loading, hauling, handling, erection and pouring of the slab to minimize damage and shall be fully responsible for all repairs and cleaning of the coating systems as required by the engineer.

** Piles for Bent No. 2 collision wall do not require driving. These piles shall be centered in oversized prebored holes with minimum diameter of 2'-0" and shall be backfilled with concrete to top of rock. Minimum socket into competent rock shall be 3'-0". Concrete shall have a minimum strength at 28 days of 4000 psi, a min. slump at placement of 5"(+/- 1") and maximum aggregate size of 3/8". Fill all void space above concrete with sand per Sec 702.4.3, or at contractor's option, backfill with concrete as indicated to extend to the bottom of collision wall footing.

General Notes (Cont.):

Miscellaneous:
Traffic over structure to be maintained during construction. See Roadway plans for traffic control.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Sec 106 and Field Section (FS-T21 from Materials Manual.

"Sec" refers to the sections in the standard and supplemental specifications unless specified otherwise.

Repair of Concrete Deck (Half-Scaling):

Payment for repair of concrete deck (half-scaling) for a maximum quantity of 50 square feet will be considered completely covered by the contract unit price for the Low Slump Concrete Wearing Surface. If the quantity of half-scaling is greater than 50 square feet, payment for the amount in excess of 50 square feet will be paid for in accordance with Sec 104.3.

Revised Structures:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field before ordering new material.

Bars bonded in old concrete not removed shall be cleanly stripped and embedded into new concrete where possible. If length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and not covered with new concrete shall be coated with an approved qualified spectra barrier in accordance with Sec 724.

In order to maintain grade and a minimum thickness of overlay as shown on plans it may be necessary to use additional quantities of overlay at various locations throughout the structure. The cost of furnishing and installing the overlay will be considered completely covered by the contract unit price, including all additional labor, materials or equipment for variations in thickness of overlay.

Longitudinal dimensions are based on the original design plans.

Sheet No. 2 of 34

Deleted 1/22/08

A211164

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ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	3A

JOB NO. J4I1641D

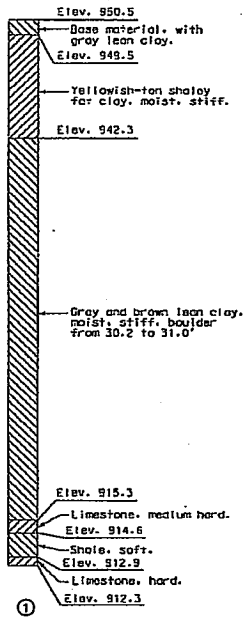
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-2366
Certificate of Authority No.: 030332



FOOTING & PILE DATA

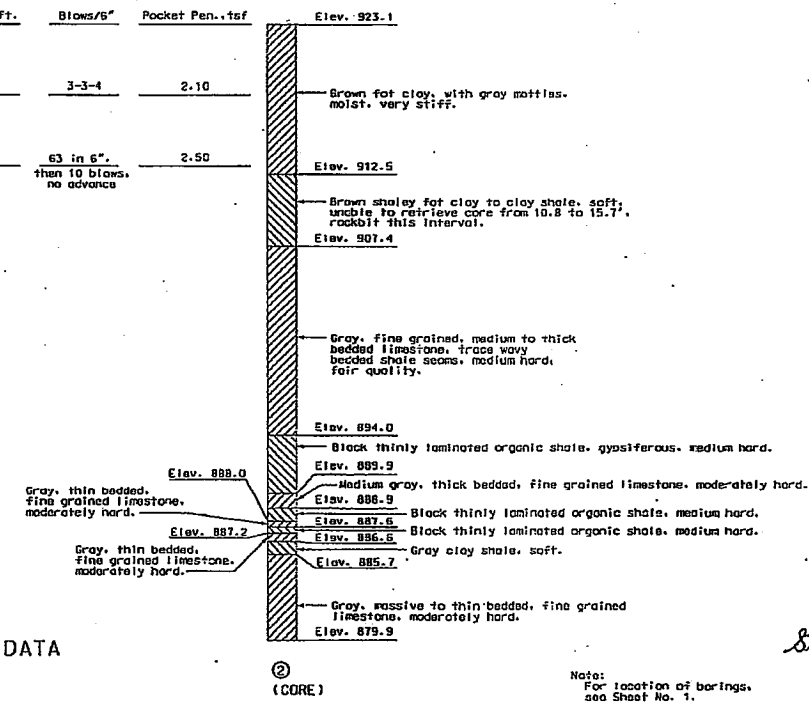
	Bent No.		1	2 (Coll. Wall)	2 (Column)	3	4	5
Bearing Pile	Pile Type and Size		HP10x42					HP10x42
	Number		2					2
	Approximate Length	foot	41					21
	Design Bearing	kip	85					85
	Hammer Energy Required	foot-pound	12,600					12,600
Spread Footings	Foundation Material					Limestone	Shale	
	Design Bearing	kip/sq. foot				10	10	
Rock Socket	Foundation Material			Limestone	Limestone			
	Number			5	1			
	Diameter			3'-0"	3'-0"			
	Design Bearing (Side Resistance)	tons		127	254			

Minimum energy requirement of hammer is based on plan length and design bearing value of piles.
All piles, except for Bent No. 2 collision wall, shall be driven to practical refusal.
Prebore for piles at Bent No. 2 to elevation 902.5.
Prebore for piles at Bent No. 5 to elevation 927.00.
Backfill all prebored piles in accordance with Sec 702.4.3.
Manufactured pile point reinforcement shall be used on all driven piles in this structure.
For rock socket allowable side resistance values, see Table. End bearing shall not be considered.
Concrete coring shall be performed on Bent 2 (column) drilled shaft and rock socket.

ROCK SOCKET ALLOWABLE SIDE RESISTANCE VALUES

BENT	Elev. From - To	Side Resistance (Tsf)
2	902.0 - 894.0	4.5
	894.0 - 885.0	3.5
	885.0 - 880.0	4.5

Depth, ft.	Standard Penetration Test Blows/6"	Pocket Pen., tsf
5.0	3-3-4	2.10
10.0	63 in 6", then 10 blows, no advance	2.50



BORING DATA

Note:
For location of borings, see Sheet No. 1.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19947
REGISTERED PROFESSIONAL ENGINEER

Stephen A. Pellegrino
11-25-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 3A of 34

⚠ New sheet. Replaces sheet 3. 11/21/08

A21164 REV.

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ROUTE	STATE	DISTRICT	SHEET NO.
I470	MD	4	3

JOB NO. J4I1641D

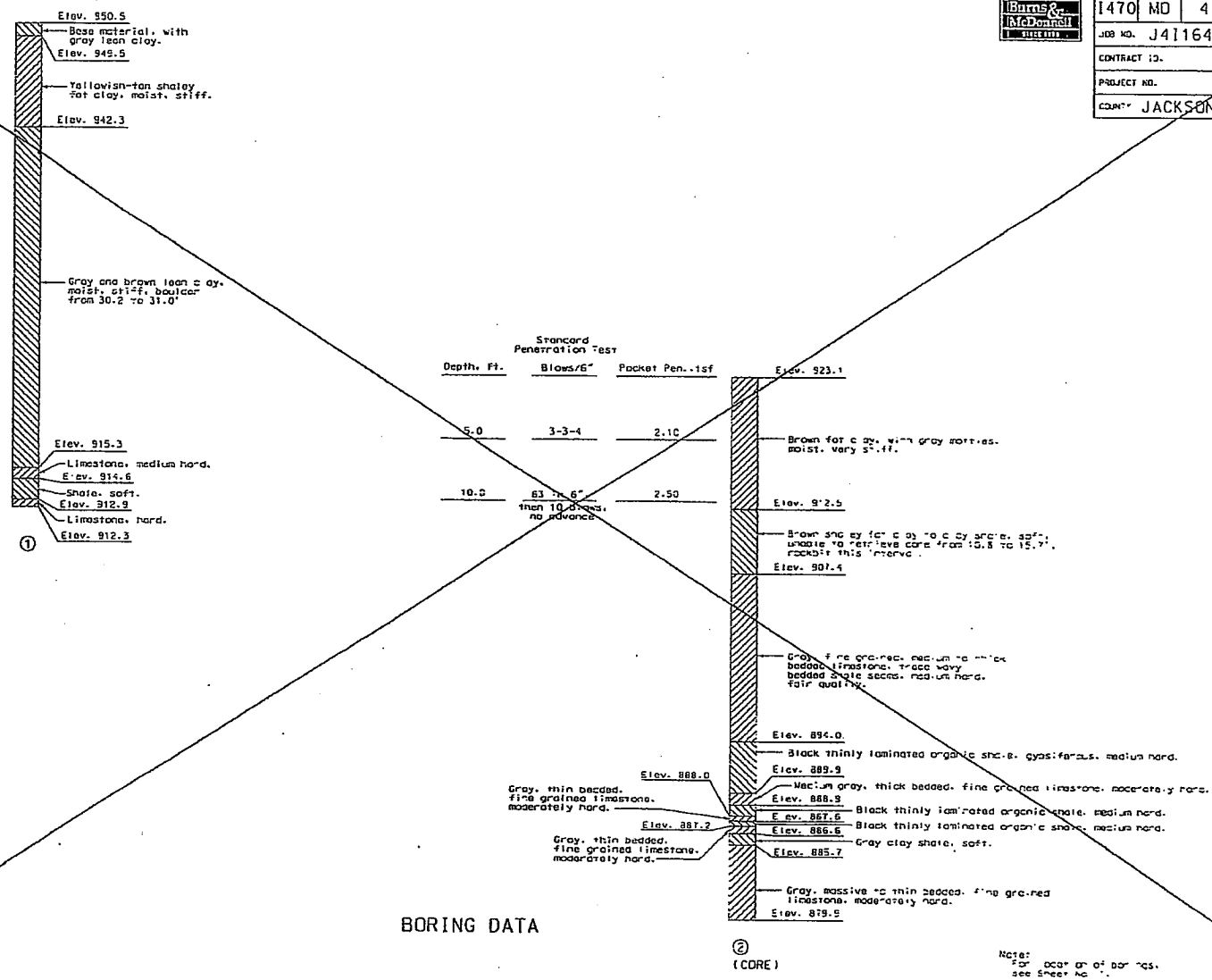
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

Burns & McDonnell SINCE 1898



BORING DATA

Note: For location of borings, see Sheet No. 1.

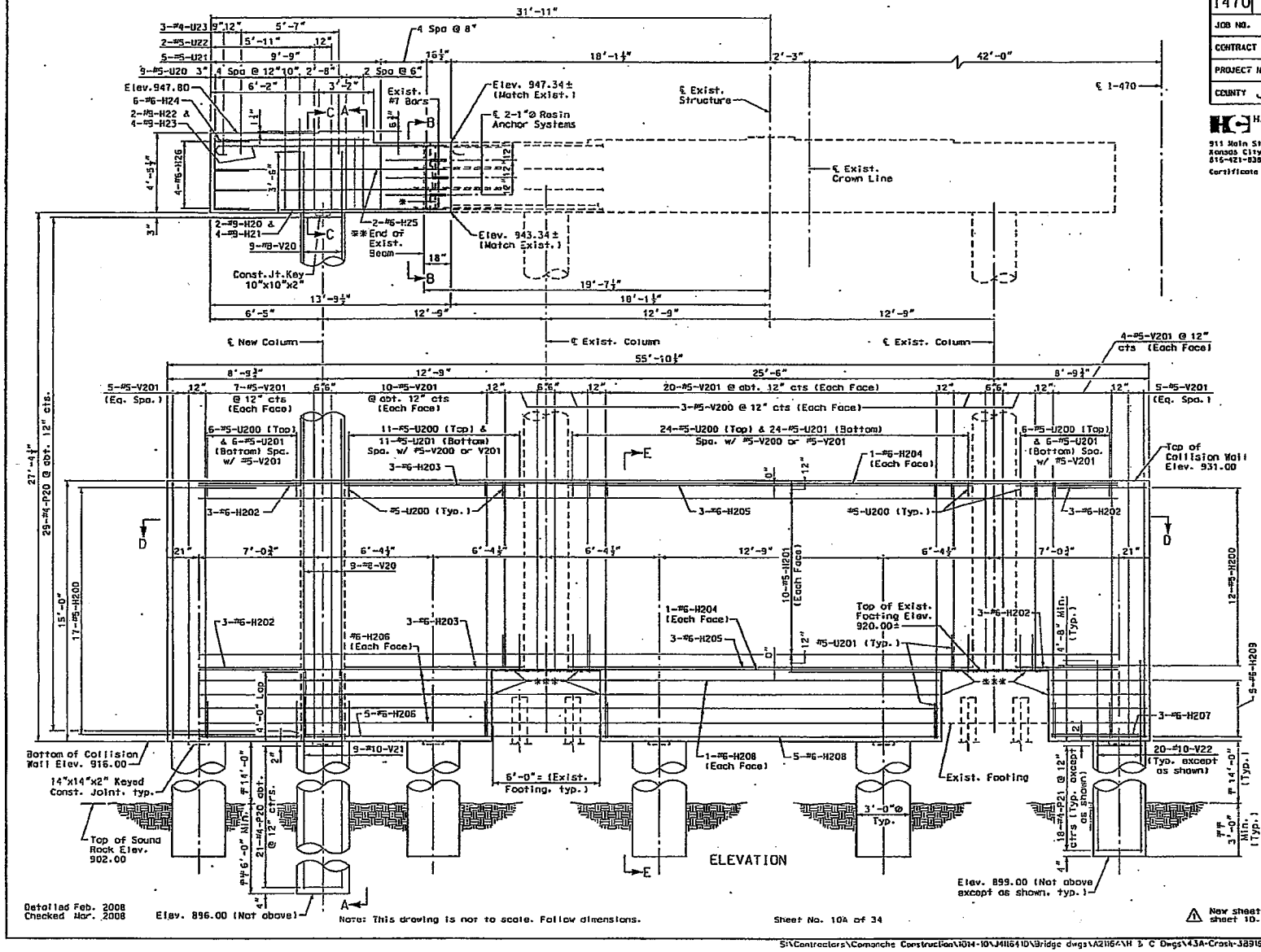
Detailed Feb. 2008
Checked Dec. 2008

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

Sheet No. 3 of 34

Deleted 11/21/08

A21164



ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	10A

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

* Existing #5 Stirrup

** For concrete removal, see Sheet No. 11A.

*** ¾" Preformed Joint Filler (Typ.)

Pay Limits for Drilled Shaft (3ft. 0in. dia.)

Pay Limits for Rock Socket (3ft. 0in. dia.)

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19617
REGISTERED PROFESSIONAL ENGINEER

Stephen A. Pellegrino
11-25-08

Notes:
For Sections B-B and C-C, see Sheet No.11A.
For Sections A-A, D-D and E-E, see Sheet No.12A.
For resin anchor notes, see Sheet No.11A.

Detailed Feb. 2008
Checked Mar. 2008

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

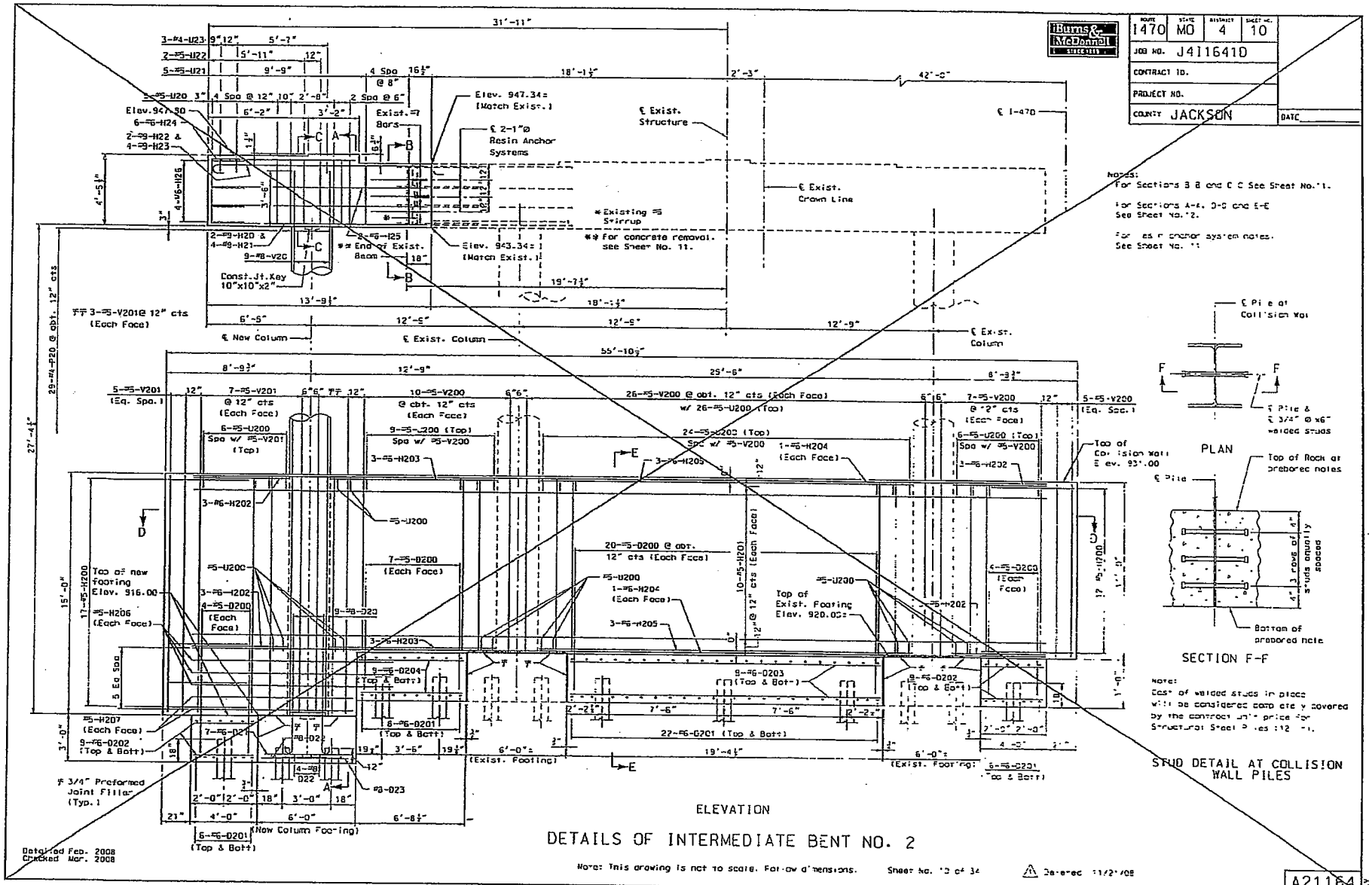
Sheet No. 10A of 34

⚠ New sheet. Replaces sheet 10. 11/21/08

A21164

REV.

S:\Contractors\Comanche Construction\I014-10\J4I1641D\Bridge dwgs\A21164\H & C Dwgs\43A-Crash-38916_WB_int-bent2.dgn 9:47:41 AM 11/25/2008



DETAILS OF INTERMEDIATE BENT NO. 2

Note: This drawing is not to scale. Follow dimensions. Sheet No. 10 of 34 Deleted 11/21/08

A21164

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	11A

JOB NO. J4I1641D

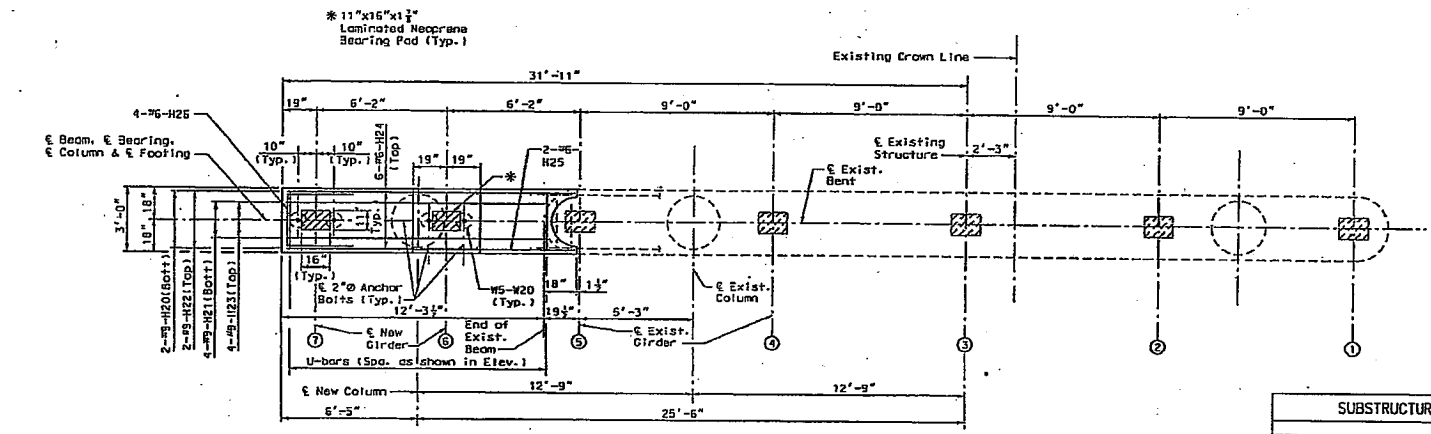
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

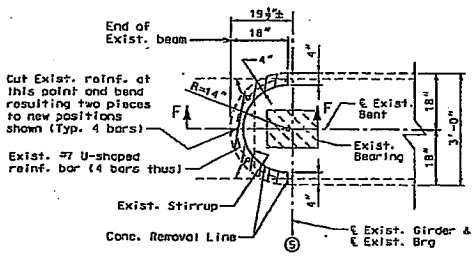
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
915 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332



PLAN

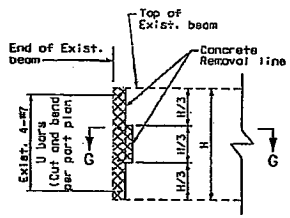
SUBSTRUCTURE QUANTITY TABLE FOR BENT NO. 2		
ITEM		QUANTITY
Class 1 Excavation	cu. yard	99
Drilled Shafts (3 ft. 0 in. Dia.)	linear foot	84
Rock Sockets (3 ft. 0 in. Dia.)	linear foot	21
Foundation Inspection Holes	linear foot	81
Concrete Coring	linear foot	21
Class B Concrete (Substructure)	cu. yard	105.5
Reinforcing Steel (Bridges)	pound	18,107

Note: These quantities are included in the Estimated Quantities Table on Sheet No. 2A.

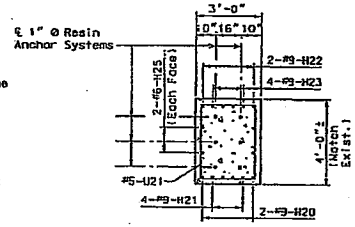


Note:
1. Cut exist. reinf. only where specifically indicated. Do not cut or damage any other reinf.

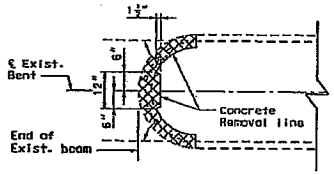
PART PLAN SHOWING CONCRETE REMOVAL AT NORTH END OF EXIST BENT BEAM



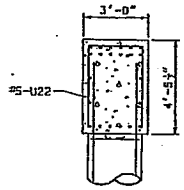
SECTION F-F



SECTION B-B



SECTION G-G



SECTION C-C

Notes:
1. All vertical reinforcement bars in the substructure beams or caps shall be field adjusted to clear piles by at least 1 1/2".
2. All reinforcing bars in the tops of substructure beams or caps shall be spaced to clear anchor bolt walls for bearings by at least 1/2".
3. The contractor shall use one of the qualified resin anchor systems in accordance with Sec 1039.
4. Cost of furnishing and installing the resin anchor system complete in-place will be considered completely covered by the contract unit price for Class B Concrete (Substructure).
5. The minimum embedment depth in concrete with f'c = 4,000 psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5". A #8 Grade 60 reinforcing bar 4'-3" long shall be substituted for the 1"Ø threaded rod. A #6 Grade 60 reinforcing bar 3'-0" (unless shown otherwise) long shall be substituted for the 3/4" threaded rod.
6. For locations of Sections B-B and C-C, see Sheet No. 10A.
7. For details of anchor bolt wall, see Sheet No. 14.

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 11A of 34

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-1997
PROFESSIONAL ENGINEER

1 New sheet. Replaces sheet 11. 11/21/08

A21164

REV.

S:\Contractors\Comanche Construction\1014-10\J4I1641D\Bridge dwgs\A21164\H & C Dwgs\44A-38955_WB_Int-Bent2-Dtls.dgn 11/25/2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	11

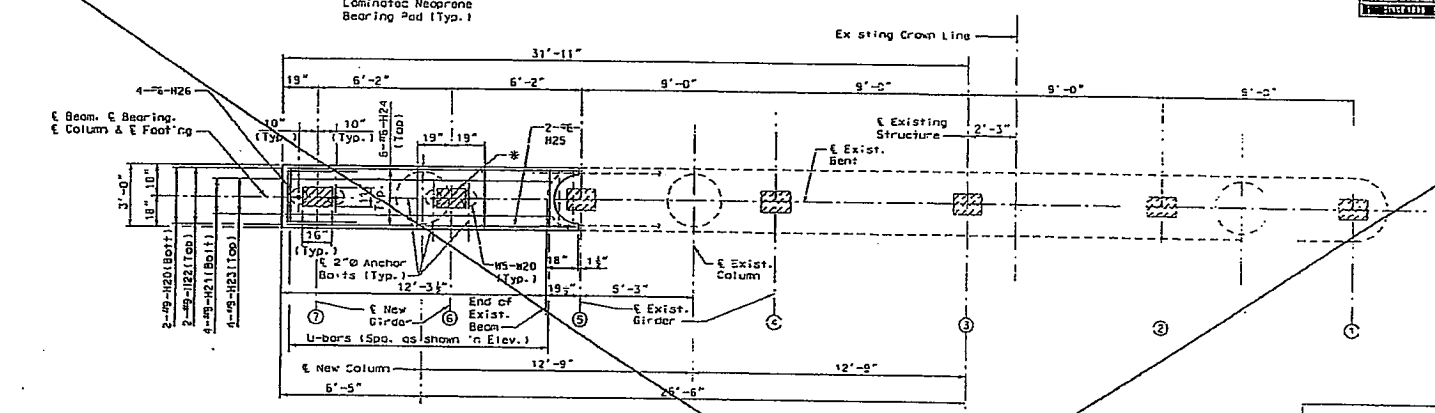
JOB NO. J4I1641D

CONTRACT ID.

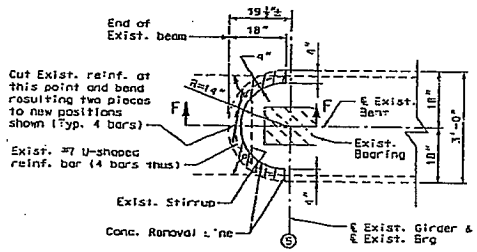
PROJECT NO.

COUNTY JACKSON

DATE



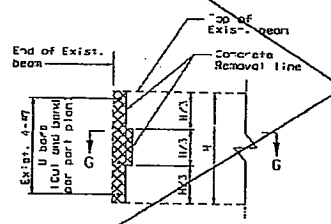
PLAN



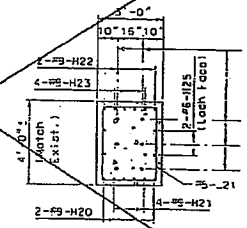
Note:

1. Cut exist. reinf. only where specifically indicated. Do not cut or damage any other reinf.

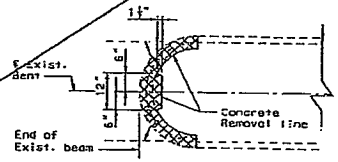
PART PLAN SHOWING CONCRETE REMOVAL AT NORTH END OF EXIST BENT BEAM



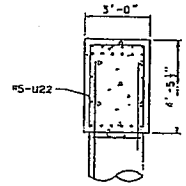
SECTION F-F



SECTION B-B



SECTION G-G



SECTION C-C

SUBSTRUCTURE QUANTITY TABLE FOR BENT NO. 2		
ITEM		QUANTITY
Class I Excavation	cu. yard	220
Structural Steel Piles (12 in.)	linear foot	264
Pre-Bore For Piling	linear foot	246
Pile Point Reinforcement	each	4
Class B Concrete (Substructure)	cu. yard	129.1
Reinforcing Steel (Bridges)	pound	8710

Note: These quantities are included in the Estimated Quantities Table on Sheet No. 2.

Notes:

1. All vertical reinforcement bars in the substructure beams or caps shall be field adjusted to clear piles by at least 1 1/2".
2. All reinforcing bars in the tops of substructure beams or caps shall be spaced to clear anchor bolt wells for bearings by at least 1 1/2".
3. The contractor shall use one of the qualified resin anchor systems in accordance with Sec 1035.
4. Cost of furnishing and installing the resin anchor system complete in place will be considered completely covered by the contract unit price for Class B Concrete (Substructure).
5. The minimum embedment depth in concrete with f'c = 4,000 psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5". A #8 Grade 60 reinforcing bar 4'-3" long shall be substituted for the 1" Ø threaded rod. A #6 Grade 60 reinforcing bar 3'-0" (unless shown otherwise) long shall be substituted for the 3/4" threaded rod.
6. For locations of Sections B-B and C-C, see Sheet No. 10.
7. For details of anchor bolt wells, see Sheet No. 14.

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 11 of 34

Revised 11/21/08

A21164

S:\Contractors\Comanche Construction\1014 [illegible]

ROUTE	STATE	DISTRICT	SHEET NO.
470	MO	4	12A

JOB NO. J4I1641D

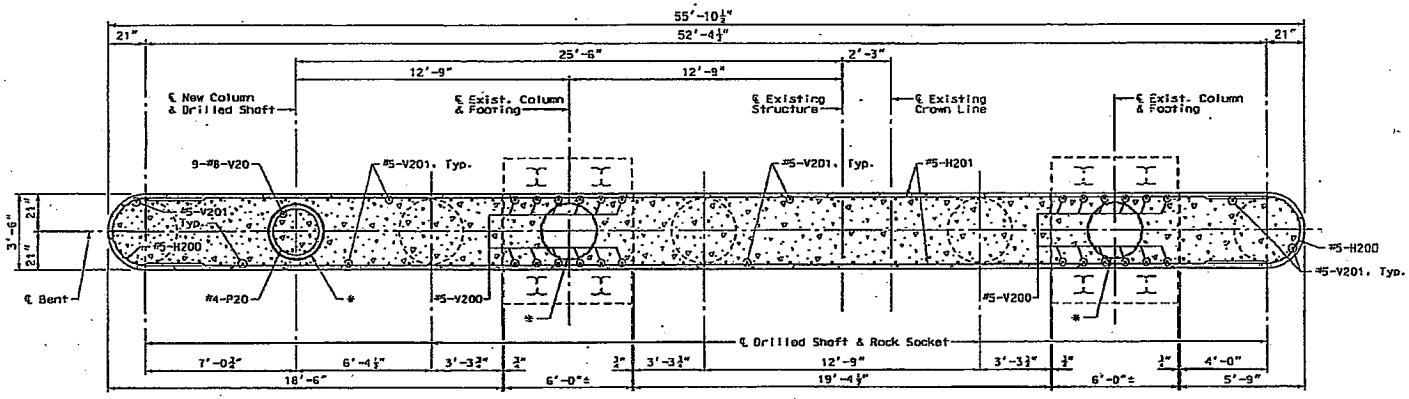
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

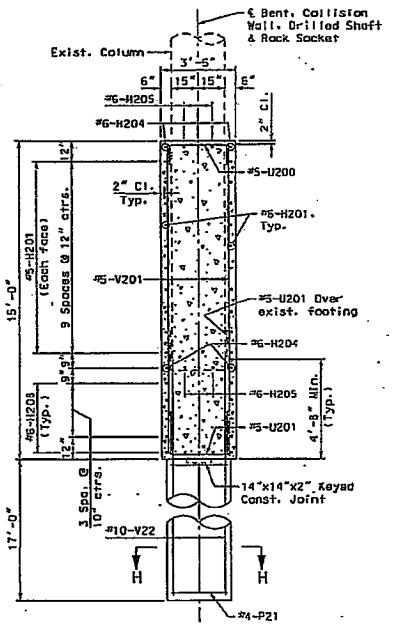
DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

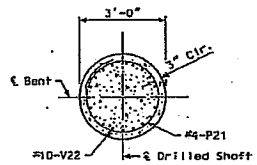


SECTION D-D

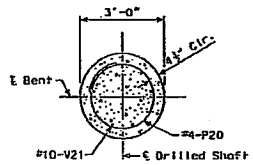
* ¾" Preformed joint filler. Seal around top with polyurethane joint sealant.



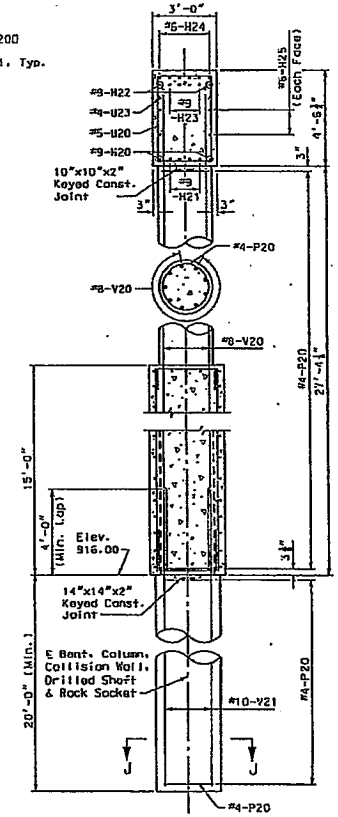
SECTION E-E



SECTION H-H



SECTION J-J



SECTION A-A
(Collision Wall reinforcing not shown for clarity, see Section E-E)

Note:
For location of Sections A-A, D-D and E-E, see Sheet No. 10A.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19517
PROFESSIONAL ENGINEER

11-25-08

DETAILS OF INTERMEDIATE BENT NO. 2

Detailed Feb. 2008
Checked Mar. 2008

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

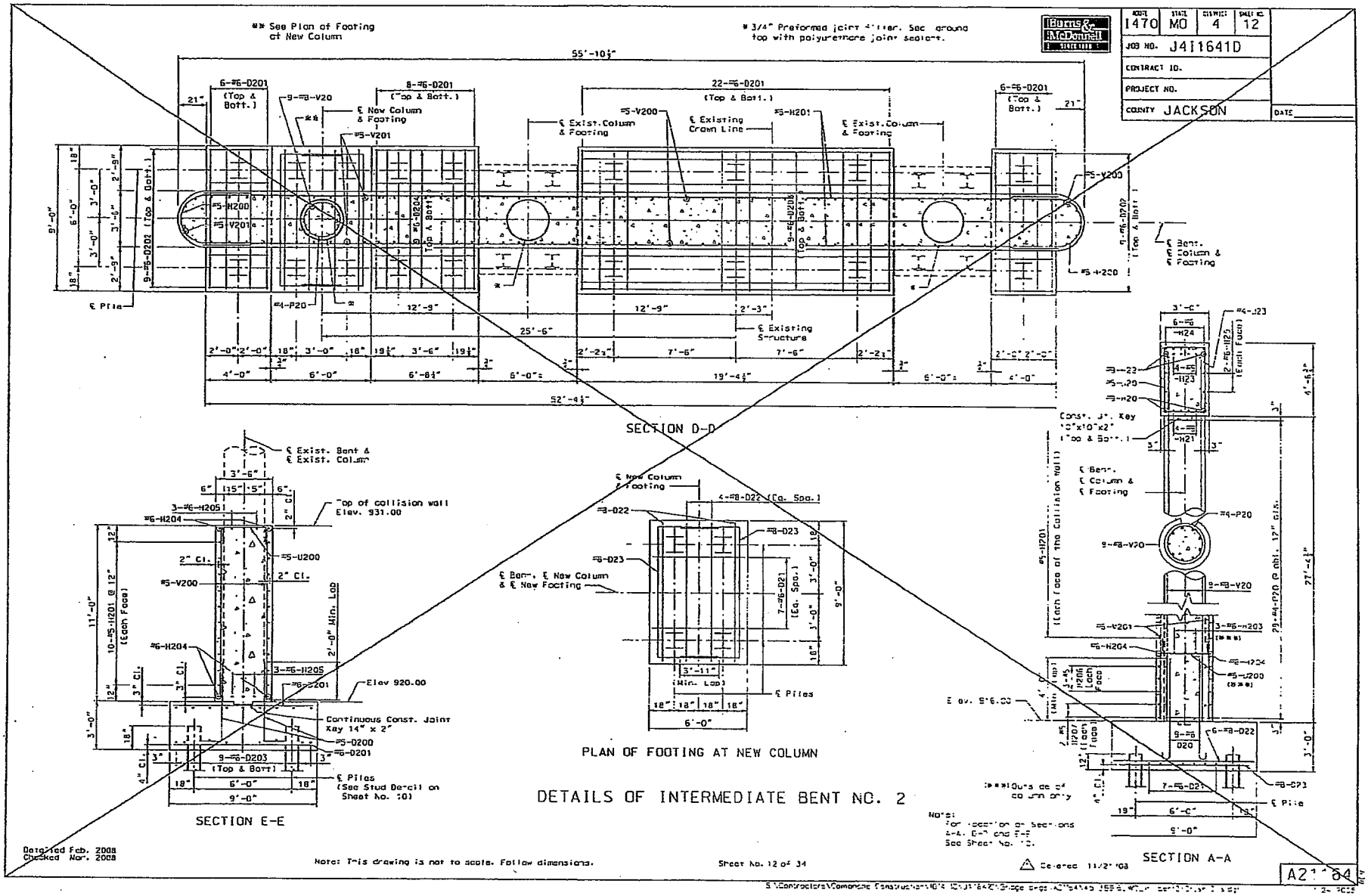
Sheet No. 12A of 34

⚠ New sheet. Replaces sheet 12. 11/21/08

A21164

REV.

S:\Contractors\Comanche Construction\1014-10\J4I1641D\Bridge dwgs\A21164\H & C Dwgs\45A-38916_WB_Mt-Bent2-Cross-Dtls.dgn 11/25/2008



DETAILS OF INTERMEDIATE BENT NO. 2

HOUSE	STATE	DISTRICT	SHEET NO.
I470	MO	4	32

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

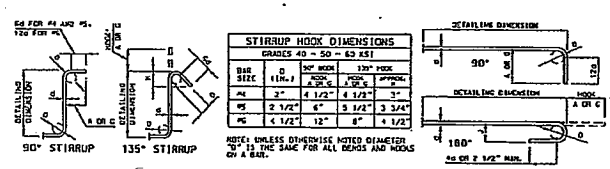
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. / SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (S)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
		SUBSTR																
		INT. BENT 2																
2	9 H20	BEAM		20		X			13 7.000							13 2	13 2	92
4	9 H21	BEAM		20		X			12 5.000							12 5	12 5	169
2	9 H22	BEAM		17		X			13 7.000							14 10	14 10	101
4	9 H23	BEAM		17		X			12 5.000							12 8	13 8	186
6	6 H24	BEAM		20		X			9 0.000							9 0	9 0	81
4	6 H25	BEAM		20		X			13 7.000							13 7	13 7	92
4	5 H26	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
29	5 H200	COL. WALL		7		X			4 7.000	3 2.000						11 0	11 0	333
20	5 H201	COL. WALL		20		X			32 3.000							52 5	52 5	1233
12	6 H202	COL. WALL		20		X			5 10.000							5 10	5 10	105
6	6 H203	COL. WALL		20		X			9 10.000							9 10	9 10	29
4	6 H204	COL. WALL		20		X			52 5.000							52 5	52 5	315
6	6 H205	COL. WALL		20		X			22 7.000							22 7	22 7	204
13	6 H206	COL. WALL		20		X			16 8.000							16 8	16 8	325
3	6 H207	COL. WALL		20		X			5 1.000							5 1	5 1	23
13	6 H208	COL. WALL		20		X			19 2.000							19 2	19 2	374
3	5 H209	COL. WALL		7		X			5 5.500							12 8	12 8	66
50	4 P20	COLUMN		16		X			2 3.000							9 0	9 0	301
50	4 P21	COL. / SHAFTS		16		X			2 6.000							9 10	9 10	591
9	5 U20	BEAM		13	S	X			2 3.000	4 2.000	2 9.000	4 2.000				14 2	14 5	135
5	5 U21	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5 U22	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4 U23	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
49	5 U200	COLL. WALL		10	S	X				10.000	3 0.000					4 9	4 5	272
49	5 U201	COLL. WALL		10	S	X				2 0.000	3 0.000					7 0	6 10	335
5	8 V20	COLUMN		20		X			30 10.000							30 10	30 10	741
9	10 V21	DRILLED SHAFT		20		X			24 0.000							24 0	24 0	929
100	10 V22	DRILLED SHAFT		20		X			21 8.000							21 8	21 8	9,323
24	5 V200	COLL. WALL		20		X			10 0.000							10 7	10 7	265
42	5 V201	COLL. WALL		20		X			14 0.000							14 7	14 7	1359
4	45 X20	BEAM		22		X			18.000	9.125						26 1	26 1	18
		INT. BENT 3																
12	8 P30	COL. /FTG		17		X			4 0.000							8 11	8 11	236
13	5 P31	FOOTING		18		X			6 2.000							7 4	7 4	59
12	5 P32	FOOTING		18		X			6 2.000							7 4	7 4	92
2	9 H30	BEAM		20		X			13 7.000							13 7	13 7	92
4	9 H31	BEAM		20		X			12 5.000							12 5	12 5	169
2	9 H32	BEAM		17		X			13 7.000							14 10	14 10	101
4	9 H33	BEAM		17		X			12 5.000							12 8	13 8	186
6	6 H34	BEAM		20		X			9 0.000							9 0	9 0	81
4	6 H35	BEAM		20		X			13 7.000							13 7	13 7	92
4	6 H36	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. / SIZE MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (S)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
35	4 P30	COLUMN		16		X			2 3.000							9 0	9 0	210
5	5 U30	BEAM		13	S	X			2 9.000	4 1.000	2 9.000	4 1.000				14 7	14 3	134
5	5 U31	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
7	5 U32	BEAM		10	S	X				4 1.000	2 9.000					10 11	10 0	22
3	4 U33	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
12	8 V30	COLUMN		20		X			37 11.000							37 11	37 11	1215
4	45 X30	BEAM		22		X			18.000	9.125						26 1	26 1	18
		INT. BENT 4																
3	8 P40	COL. /FTG		17		X			7 0.000							7 11	7 11	180
12	5 P41	FOOTING		18		X			5 8.000							6 10	6 10	86
11	5 P42	FOOTING		18		X			5 8.000							6 10	6 10	78
2	9 H40	BEAM		20		X			13 7.000							13 7	13 7	92
4	9 H41	BEAM		20		X			12 5.000							12 5	12 5	169
2	9 H42	BEAM		17		X			13 7.000							14 10	14 10	101
4	9 H43	BEAM		17		X			12 5.000							13 8	13 8	186
6	6 H44	BEAM		20		X			9 0.000							9 0	9 0	81
4	6 H45	BEAM		20		X			13 7.000							13 7	13 7	92
4	6 H46	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
22	4 P40	COLUMN		16		X			2 3.000							9 0	9 0	132
9	5 U40	BEAM		13	S	X			2 9.000	4 2.000	2 9.000	4 2.000				14 9	14 5	135
5	5 U41	BEAM		13	S	X			2 9.000	3 9.000	2 9.000	3 9.000				13 11	13 7	71
2	5 U42	BEAM		10	S	X				4 2.000	2 9.000					11 1	10 11	23
3	4 U43	BEAM		10	S	X				12.000	2 9.000					4 9	4 7	9
8	8 V40	COLUMN		20		X			24 5.000							24 5	24 5	587
4	45 X40	BEAM		22		X			18.000	9.125						26 1	26 1	18
		SUPERSER																
		END BENT 1																
8	6 H11	BEAM		18					11 8.000							13 0	13 0	156
4	6 H12	BEAM		20					11 8.000							11 8	11 8	70
6	6 H13	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4 H14	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6 H15	WING		20					10 6.000							10 6	10 6	95
2	6 H16	WING		20					9 8.000							9 8	9 8	29
2	6 H17	WING		20					4 4.000							4 4	4 4	13
2	6 H18	WING		20					2 4.000							2 4	2 4	7
2	6 T11	WING		23					2 0.000	2 9.000	8 2.000			14.350	2 5.500	12 11	12 10	39
11	5 U11	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 8	10 4	119
4	4 U12	BEAM		10	S					2 7.500	2 3.000					7 6	7 4	20
15	6 U13	DIAPHRAGM		15	S				3 6.000	5 0.000						5 6	5 4	84
11	4 U14	DIAPHRAGM		15	S				3 6.000	21.000						5 3	5 3	38
13	4 U15	APP. HAUNCH		10	S					18.000	6.000					3 6	3 4	29
5	6 U16	DIAPHRAGM		15	S				5 0.000	21.000						6 9	6 7	49



STIRRUP HOOK DIMENSIONS			
GRADES 40 - 50 - 60 KSI			
BAR SIZE	D (IN.)	90° HOOK HOOK A OR C	135° HOOK HOOK A OR C	EXTENSION B
#4	3"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

END HOOK DIMENSIONS			
	ALL GRADES		
BAR SIZE	D (IN.)	180° HOOK A OR C	90° HOOK J	90° HOOK A OR C
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	8 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	14 1/4"	2'-3"	21 3/4"	2'-2"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP
S = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. NEAREST INCH.
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHAMFER SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19517
REGISTERED PROFESSIONAL ENGINEER

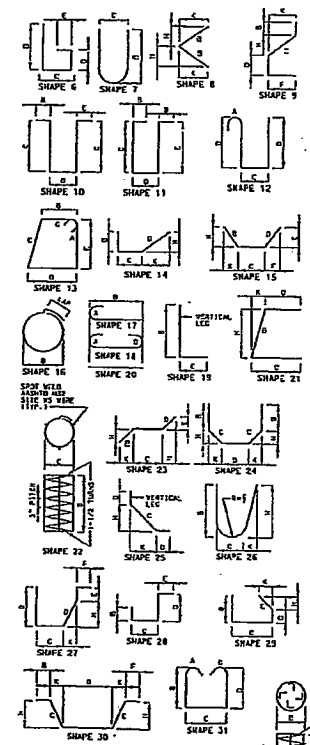
11-25-08

Detailed Feb. 2008
Checked Mar. 2006

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

Sheet No. 32A of 34

New sheet. Replaces sheet 32. 11/21/08



BENDING DIAGRAMS

A21164

ROUTE	STATE	DISTRICT	SHEET NO.
1470	MO	4	32

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

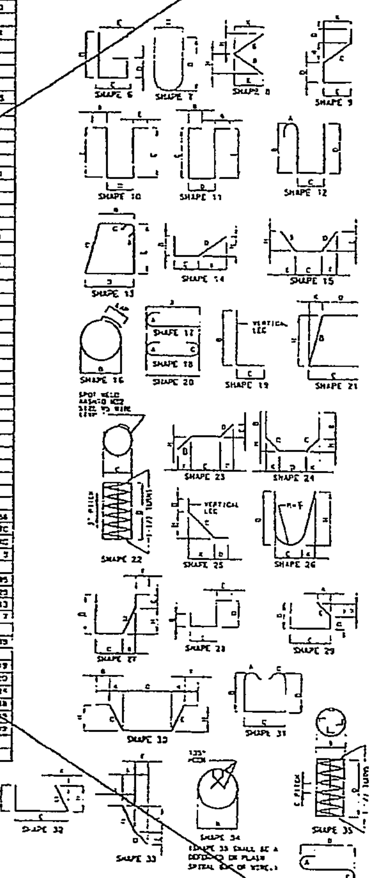
Burns & McDonnell

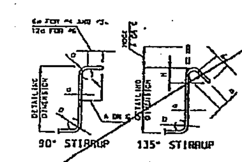
BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
			SUBSTR																
			INT. BENT 2																
9	8	D20	COL. /FTG		17		X			7 0.000							7 11	7 11	150
7	6	D21	FOOTING		20		X			5 8.000							5 8	5 8	60
6	8	D22	FOOTING		20		X			8 8.000							8 8	8 8	139
7	8	D23	FOOTING		10		X				4 6.000	8 0.000					17 0	16 7	89
70	5	D200	COLL.WALL /FTG		19		X			4 10.000	10.000						5 8	5 7	408
84	6	D201	COLL.WALL FTG		20		X			8 8.000							8 8	8 8	1094
36	6	D202	COLL.WALL FTG		20		X			3 8.000							3 8	3 8	198
18	6	D203	COLL.WALL FTG		20		X			19 0.000							19 0	19 0	514
18	6	D204	COLL.WALL FTG		20		X			6 3.000							6 3	6 3	169
2	9	H20	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H21	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H22	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H23	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H24	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H25	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H26	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
25	5	H200	COLL. WALL		7		X			4 7.000	3 2.000						11 0	11 0	333
30	5	H201	COLL. WALL		20		X			52 5.000							52 5	52 5	1093
12	6	H202	COLL. WALL		20		X			5 10.000							5 10	5 10	105
6	6	H203	COLL. WALL		20		X			9 10.000							9 10	9 10	89
4	6	H204	COLL. WALL		20		X			52 5.000							52 5	52 5	315
6	6	H205	COLL. WALL		20		X			22 7.000							22 7	22 7	204
6	5	H206	COLL. WALL		20		X			12 2.000							12 2	12 2	76
4	5	H207	COLL. WALL		20		X			9 8.000							9 8	9 8	40
29	4	P20	COLUMN		16		X			2 3.000							9 0	9 0	174
5	5	U20	BEAM		13	S	X			2 3.000	4 2.000	2 3.000	4 2.000				14 9	14 5	135
5	5	U21	BEAM		13	S	X			2 3.000	3 9.000	2 3.000	3 9.000				13 11	13 7	71
2	5	U22	BEAM		10	S	X				4 2.000	2 3.000					11 3	10 11	23
3	4	U23	BEAM		10	S	X				12.000	2 3.000					4 9	4 7	9
50	5	U200	COLL. WALL		10	S	X				10.000	3 0.000					4 3	4 6	277
9	8	V20	COLUMN		20		X			30 11.000							30 11	30 11	743
91	5	V200	COLL. WALL		20		X			10 7.000							10 7	10 7	1004
29	5	V201	COLL. WALL		20		X			14 7.000							14 7	14 7	380
4	#5	W20	BEAM		22		X			18.000	9.125						26 1	26 1	18
			INT. BENT 3																
12	8	D30	COL. /FTG		17		X			8 6.000							8 11	8 11	266
13	5	D31	FOOTING		18		X			6 2.000							7 4	7 4	99
12	5	D32	FOOTING		10		X			6 2.000							7 4	7 4	92
2	9	H30	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H31	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H32	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H33	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H34	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H35	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H36	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52

BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
35	4	P30	COLUMN		16		X			2 3.000							9 3	9 0	210
5	5	U30	BEAM		13	S	X			2 9.000	4 1.000	2 3.000	4 1.000				14 7	14 3	134
5	5	U31	BEAM		13	S	X			2 9.000	3 9.000	2 3.000	3 9.000				13 11	13 7	71
2	5	U32	BEAM		10	S	X				4 1.000	2 3.000					10 11	10 9	22
3	4	U33	BEAM		10	S	X				12.000	2 3.000					4 9	4 7	9
12	8	V30	COLUMN		20		X			37 11.000							37 11	37 11	1215
4	#5	W30	BEAM		22		X			18.000	9.125						26 1	26 1	18
			INT. BENT 4																
9	8	D40	COL. /FTG		17		X			7 0.000							7 11	7 11	190
12	5	D41	FOOTING		18		X			5 8.000							6 10	6 10	86
11	5	D42	FOOTING		18		X			5 8.000							6 10	6 10	78
2	9	H40	BEAM		20		X			13 7.000							13 7	13 7	92
4	9	H41	BEAM		20		X			12 5.000							12 5	12 5	169
2	9	H42	BEAM		17		X			13 7.000							14 10	14 10	101
4	9	H43	BEAM		17		X			12 5.000							13 8	13 8	186
6	6	H44	BEAM		20		X			9 0.000							9 0	9 0	81
4	6	H45	BEAM		20		X			13 7.000							13 7	13 7	82
4	6	H46	BEAM		10	S	X				3 1.000	2 7.500					8 10	8 8	52
22	4	P40	COLUMN		16		X			2 3.000							9 0	9 0	132
5	5	U40	BEAM		13	S	X			2 3.000	4 2.000	2 3.000	4 2.000				14 9	14 5	135
5	5	U41	BEAM		13	S	X			2 3.000	3 9.000	2 3.000	3 9.000				13 11	13 7	71
2	5	U42	BEAM		10	S	X				4 2.000	2 3.000					11 3	10 11	23
3	4	U43	BEAM		10	S	X				12.000	2 3.000					4 9	4 7	9
9	8	V40	COLUMN		20		X			24 5.000							24 5	24 5	587
4	#5	W40	BEAM		22		X			18.000	9.125						26 1	26 1	18
			SUPERSTR																
			END CURT.																
6	6	H11	BEAM		18					11 8.000							13 0	13 0	156
4	6	H12	BEAM		20					11 8.000							11 8	11 8	70
8	6	H13	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H14	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H15	WING		20					10 6.000							10 6	10 6	95
2	6	H16	WING		20					9 8.000							9 8	9 8	29
2	6	H17	WING		20					4 4.000							4 4	4 4	13
2	6	H18	WING		20					2 4.000							2 4	2 4	7
2	6	T11	WING		25					2 0.000	2 9.000	8 2.000			14.750	2 5.500	12 11	12 12	39
11	5	U11	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 4	10 4	119
4	4	U12	BEAM		10	S					2 7.500	2 3.000					7 6	7 4	20
15	4	U13	DIAPHRAGM		19	S				3 6.000	5 0.000						3 6	8 [illegible]	24
11	4	U14	DIAPHRAGM		19	S				3 6.000	21.000						5 3	5 2	38
13	4	U15	APP. HAUNCH		10	S					18.000	9.000					3 6	3 4	29
5	6	U16	DIAPHRAGM		19	S				5 0.000	21.000						6 9	6 7	50



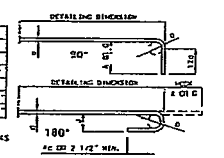


STIRRUP HOOK DIMENSIONS

GRADES 40 - 50 - 60 KSI

BAR SIZE	D (IN.)	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS

ALL GRADES

BAR SIZE	D (IN.)	180° HOOKS: A OR G	180° HOOKS: J	90° HOOKS: A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

Detailed Feb. 2008
Checked Mar. 2008

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

Δ Revised ../2/08

BENDING DIAGRAMS

A21164

S:\Contractors\Comanche Construction\... Bridge Dwgs ... Bending Diagrams.dgn

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	33

JOB NO. J411641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

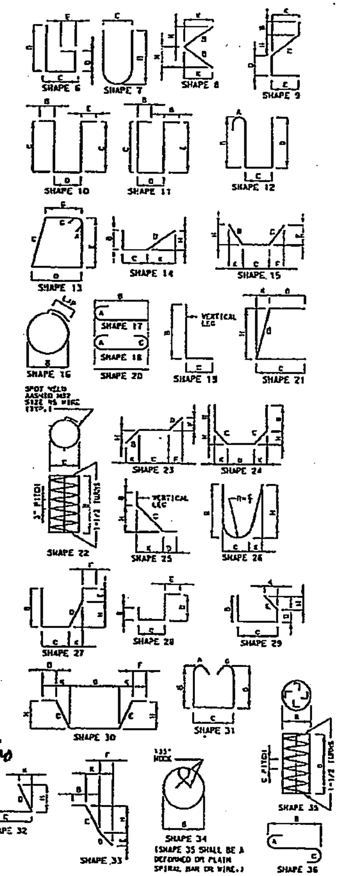
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1500
Kansas City, Missouri 64105
816-421-8386
Certificate of Authority No.: 000332

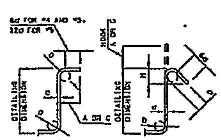
BILL OF REINFORCING STEEL

NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
16	6	V11	WING		20			V	2	3 8.000							5 8	5 8	54
			INCREMENT =							2 2.000							2 2	2 2	
8	6		6.000 INCH																
2	6	V12	WING		20					6 1.000							6 1	6 1	18
2	6	V13	WING		20					6 9.000							6 9	8 9	26
			END BENT 5																
8	6	H51	BEAM		18					11 6.000							13 0	13 0	156
4	6	H52	BEAM		20					11 8.000							11 8	11 8	70
8	6	H53	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H54	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H55	WING		20					10 6.000							10 6	10 6	95
2	6	H56	WING		20					9 5.000							9 8	9 8	25
2	6	H57	WING		20					4 4.500							4 4	4 4	13
2	6	H58	WING		20					2 4.000							2 4	2 4	7
2	5	T51	WING		25					2 0.000	2 3.000	8 2.000			14.750	2 5.500	12 11	12 10	35
31	5	U51	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 8	10 4	115
4	4	U52	BEAM		10	S					2 7.500	2 3.000					7 6	7 4	20
15	4	U53	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 5	34
11	4	U54	DIAPHRAGM		19	S				3 6.000	21.000						5 3	5 2	35
13	4	U55	APP. HAUNCH		10	S					18.000	5.000					3 6	3 4	25
5	6	U56	DIAPHRAGM		19	S				5 0.000	21.000						6 9	6 7	43
16	6	Y51	WING		20			Y	2	5 8.000							5 8	5 8	94
			INCREMENT =							2 2.000							2 2	2 2	
			6.000 INCH																
2	6	Y52	WING		20					6 1.000							6 1	6 1	18
2	6	Y53	WING		20					8 9.000							8 9	8 9	26
			SLAB																
411	5	S1	SLAB		20					14 2.000							14 2	14 2	6073
411	5	S2	SLAB		20					14 2.000							14 2	14 2	6073
76	5	S3	SLAB		20					53 2.000							53 2	53 2	4214
60	5	S4	SLAB		20					43 0.000							43 0	43 0	2691
65	6	S5	SLAB		20					34 0.000							34 0	34 0	3370
			BARRIER CURB																
212	5	R1	BARRIER CURB		26	S				2 6.000	4.250				2 6.000	3.000	5 3	5 3	1161
212	5	R3	BARRIER CURB		19	S				17.000	6.000						0 23	0 22	405
212	5	R4	BARRIER CURB		27	S					6.000	11.250	7.000	12.000	9.250	6.315	3 0	2 10	626
42	5	R5	BARRIER CURB		20					9 8.000							9 8	9 8	423
14	5	R6	BARRIER CURB		20					32 8.000							32 8	32 8	477
14	5	R7	BARRIER CURB		20					37 8.000							37 8	37 8	550
46	5	X1	BARRIER CURB		19	S				2 5.000	5.125						2 10	2 9	132
46	5	X2	BARRIER CURB		14	S				5.125	11.125	18.000			2.000	17.875	2 10	2 9	132
24	5	X3	BARRIER CURB		27	S				3 0.000	5.125	12.000	2 2.125		9.875	6.875	6 7	6 5	161

BILL OF REINFORCING STEEL

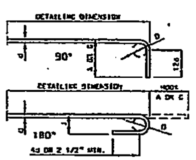
NO. REQ'D.	SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
22	5	K4	BARRIER CURB		7					3 0.000	6.000						6 4	6 4	145
2	5	K5	BARRIER CURB		25	S				2 6.500	6.750	4.375			5.500	4.000	3 6	3 5	7
2	5	K6	BARRIER CURB		25	S				2 5.500	7.875	4.375			6.500	4.500	3 6	3 5	7
2	5	K7	BARRIER CURB		25	S				2 4.125	9.625	4.375			7.875	5.500	3 6	3 5	7
2	5	K8	BARRIER CURB		25	S				2 2.750	11.250	4.375			9.250	5.500	3 6	3 5	7
24	5	K9	BARRIER CURB		20					5 7.000							5 7	5 7	140
20	4	K10	BARRIER CURB		20					7 5.000							7 5	7 5	99
2	5	K11	BARRIER CURB		8					2 2.125					2 2.000	2.375	4 4	4 4	9
			SLIP-FORM																
28	5	C1	SLIP-FORM		20					10 0.000							10 0	10 0	292
4	5	C2	SLIP-FORM		20					7 5.000							7 5	7 5	31
			TOTALS																
	4																		1720
	5																		28.809
	6																		6922
	8																		3015
	9																		1644
	10																		10.252
	Y5																		54
			TOTAL																52.420
			Slab on Steel																
	4																		360
	5																		19.289
	6																		4842
			TOTAL																24.491
			Reinforcing Steel (Bridge)																
	4																		1261
	5																		4806
	6																		2080
	8																		3819
	9																		1644
	10																		10.252
	Y5																		54
			TOTAL																23.118
			Safety Barrier Curb																
	4																		99
	5																		4389
			TOTAL																4488
			Slip-Form Option																
	5																		323
			TOTAL																323





STIRRUP HOOK DIMENSIONS					
GRADES 40 - 50 - 60 KSI					
BAR SIZE	D (IN.)	90° HOOK: HOOK A OR G	135° HOOK: HOOK A OR G	135° HOOK: APPROX. H	
#4	2"	4 1/2"	4 1/2"	3"	
#5	2 1/2"	6"	5 1/2"	3 3/4"	
#6	4 1/2"	12"	8"	4 1/2"	

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
		ALL GRADES		
BAR SIZE	D (IN.)	180° HOOKS: A OR G	180° HOOKS: J	90° HOOKS: A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-
REGISTERED PROFESSIONAL ENGINEER
11-26-08

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 33 A of 34

△ New sheet. Replaces sheet 33. 11/21/08

BENDING DIAGRAMS

A21164

REV.

SCALE	STATE	DISTRICT	SHEET NO.
1470	MO	4	33

JOB NO. J4I1641D

CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

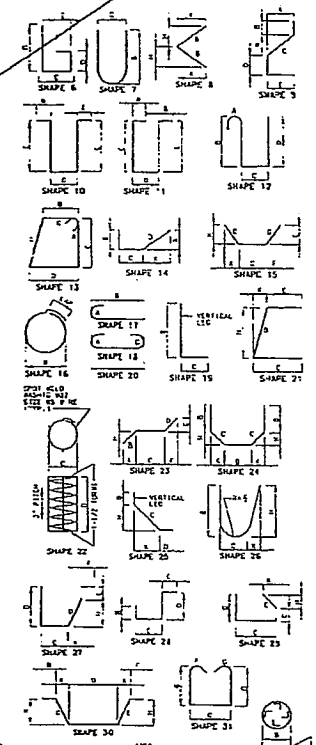
Burns & McDonnell ENGINEERING

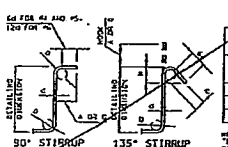
BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUSPENDED (SP)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
16	6	V11	WING		20			V	2	5 8.000							5 8	5 8	34
			INCREMENT = 6.000 INCH							2 2.000							2 2	2 2	
8	6																		
2	5	V12	WING		20					6 1.000							6 1	6 1	18
2	6	V13	WING		20					8 9.000							8 9	8 9	26
			END BENT 3																
8	6	H51	BEAM		18					11 8.000							13 0	13 0	156
4	6	H52	BEAM		20					11 8.000							11 8	11 8	70
8	6	H53	DIAPHRAGM		20					11 8.000							11 8	11 8	140
1	4	H54	APP. HAUNCH		20					13 0.000							13 0	13 0	9
6	6	H55	WING		20					10 5.000							10 5	10 6	35
2	6	H56	WING		20					9 8.000							9 8	9 8	23
2	6	H57	WING		20					4 4.000							4 4	4 4	13
2	6	H58	WING		20					2 4.000							2 4	2 4	7
2	6	T51	WING		25					2 0.000	2 9.000	8 2.000			14.350	2 5.503	12 11	12 10	38
31	5	U51	BEAM		13	S				2 3.000	2 7.500	2 3.000	2 7.500				10 8	10 4	113
4	4	U52	BEAM		18	S					2 7.500	2 3.000					7 6	7 4	20
13	4	U53	DIAPHRAGM		19	S				3 6.000	5 0.000						8 6	8 5	24
11	4	U54	DIAPHRAGM		19	S				3 6.000	21.000						5 3	5 2	38
13	4	U55	APP. HAUNCH		10	S					18.000	6.000					5 6	3 4	23
5	6	U56	DIAPHRAGM		19	S				5 0.000	21.000						6 9	6 7	48
16	6	V51	WING		20			V	2	5 8.000							5 8	5 8	34
			INCREMENT = 6.000 INCH							2 2.000							2 2	2 2	
2	6	V52	WING		20					6 1.000							6 1	6 1	18
2	6	V53	WING		20					8 9.000							8 9	8 9	26
			SLAB																
411	5	S1	SLAB		20					14 2.000							14 2	14 2	6073
411	5	S2	SLAB		20					14 2.000							14 2	14 2	6073
76	5	S3	SLAB		20					53 2.000							53 2	53 2	4714
60	5	S4	SLAB		20					43 0.000							43 0	43 0	2547
68	6	S5	SLAB		20					34 0.000							34 0	34 0	4570
			BARRIER CURB																
212	5	R1	BARRIER CURB		26	S				2 6.000	4.250				2 6.000	3.000	5 3	5 3	1161
212	5	R3	BARRIER CURB		15	S				17.000	6.000						0 33	0 22	405
212	5	R4	BARRIER CURB		27	S					6.000	11.250	7.000	12.000	9.250	6.375	3 0	2 10	626
42	5	R5	BARRIER CURB		20					9 8.000							9 8	9 8	423
14	5	R6	BARRIER CURB		20					32 8.000							32 8	32 8	477
14	5	R7	BARRIER CURB		20					37 8.000							37 8	37 8	550
46	5	W1	BARRIER CURB		19	S				2 5.000	9.125						2 10	2 9	132
46	5	W2	BARRIER CURB		14	S				5.125	11.125	18.000			7.000	17.875	2 10	2 9	132
24	5	W3	BARRIER CURB		27	S				3 0.000	5.125	12.000	2.125		5.875	6.875	6 7	6 5	161

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO. SIZE	MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUSPENDED (SP)	VARIES (V)	NO. EACH	B FT. IN.	C FT. IN.	D FT. IN.	E FT. IN.	F FT. IN.	H FT. IN.	K FT. IN.	NOMINAL LENGTH FT. IN.	ACTUAL LENGTH FT. IN.	WEIGHT LBS.
22	5	E4	BARRIER CURB		7					3 0.000	6.000						5 4	5 4	143
2	5	E5	BARRIER CURB		25	S				2 6.500	6.750	4.375			5.500	4.000	3 6	3 5	7
2	5	E6	BARRIER CURB		25	S				2 5.500	7.875	4.375			5.500	4.500	3 6	3 5	7
2	5	E7	BARRIER CURB		25	S				2 4.75	9.625	4.375			7.875	5.500	3 4	3 3	7
2	5	E8	BARRIER CURB		25	S				2 2.750	11.250	4.375			5.250	6.500	3 6	3 3	7
24	5	E9	BARRIER CURB		20					5 7.000							5 7	5 7	143
20	4	E10	BARRIER CURB		20					7 5.000							7 5	7 5	99
2	5	E11	BARRIER CURB		8					2 2.125					2 2.000	2.375	4 4	4 4	9
			SLIP-FORM																
28	5	C1	SLIP-FORM		20					10 0.000							10 0	10 0	282
4	5	C2	SLIP-FORM		20					7 5.000							7 5	7 5	3*
			TOTALS																
	4																		1000
	5																		28,659
	6																		8033
	8																		3453
	9																		9544
	MS																		54
			TOTAL																43,326
			Stop on Steel																
	4																		
	5																		352
	6																		19,283
			TOTAL																4942
																			24,591
			Reinforcing Steel (Barricades)																
	4																		
	5																		543
	6																		4651
	8																		3393
	9																		3439
	MS																		1544
			TOTAL																54
																			13,724
			Safety Barrier Curb																
	4																		
	5																		92
			TOTAL																4383
																			4475
			Slip-Form Option																
	5																		
			TOTAL																323
																			323

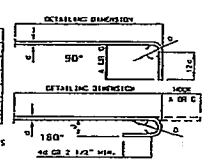




Detailed Feb. 2008
Checked Mar. 2008

STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 ASI				
BAR SIZE	D (IN.)	90° HOOK A OR C	135° HOOK A OR C	135° HOOK B
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTES: UNLESS OTHERWISE NOTED D=MINIMUM "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	# GRADES 180° HOOKS A OR E	J	90° HOOKS A OR E
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	8 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	1'-0"
#14	14 1/4"	2'-3"	25 3/4"	2'-3"

NOTE:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET
E = EPOXY COATED REINFORCEMENT.
S = STIRRUP.
* = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.
NO. EA. = NUMBER OF BARS OF EACH LENGTH.
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.
FOR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF COLUMN SPIRALS DO NOT INCLUDE SPLICES OR SPACERS.
REINFORCING STEEL (GRADE 60) FY = 60,000 PSI

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

Sheet No. 33 of 34

Revised 1/22/08

BENDING DIAGRAMS

A21164

ROUTE	STATE	DISTRICT	SHEET NO.
470	MO	4	34A

JOB NO. J4I1641D

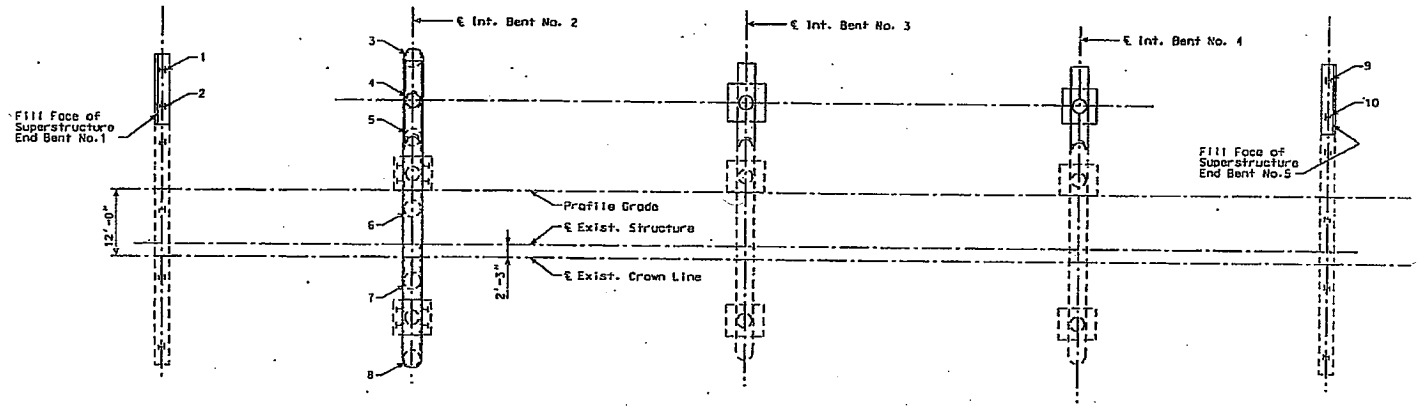
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers
911 Main Street, Suite 1900
Kansas City, Missouri 64105
816-221-8386
Certificate of Authority No.: 000332



PART PLAN SHOWING PILE NUMBERING FOR RECORDING "AS BUILT PILE" DATA

"AS BUILT PILE" DATA			
END BENT NO. 1 (HP10x42)			
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
1			
2			
INT. BENT NO. 2 (3'-0"Ø DRILLED SHAFTS)			
SHAFT NO.	BOTTOM OF DRILLED SHAFT (ELEV.)	BOTTOM OF ROCK SOCKET (ELEV.)	REMARKS
3			
4			
5			
6			
7			
8			
END BENT NO. 5 (HP10x42)			
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
9			
10			

NOTE: INDICATE IN REMARKS COLUMN:
A.) IF PILING WERE DRIVEN TO PRACTICAL REFUSAL.
B.) PILE BATTER IF OTHER THAN SHOWN ON BENT DETAIL SHEET.
C.) TYPE OF PILING USED.

NOTE: THIS SHEET TO BE COMPLETED BY MoDOT CONSTRUCTION PERSONNEL.

STATE OF MISSOURI
STEPHEN A. PELLEGRINO
NUMBER PE-19512
PROFESSIONAL ENGINEER

11-25-08

Detailed Feb. 2008
Checked Mar. 2008

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

⚠ New sheet. Replaces sheet 34. 11/21/08

A21164

S:\Contractors\Concrete Construction\1014-10\J4I1641D\Bridge dwgs\A21164\H & C Dwgs\67A-38916_YB_Pile-Data.dgn 11:12:51 AM 11/25/2008

ROUTE	STATE	DISTRICT	SHEET NO.
I470	MO	4	34

JOB NO. J4I1641D

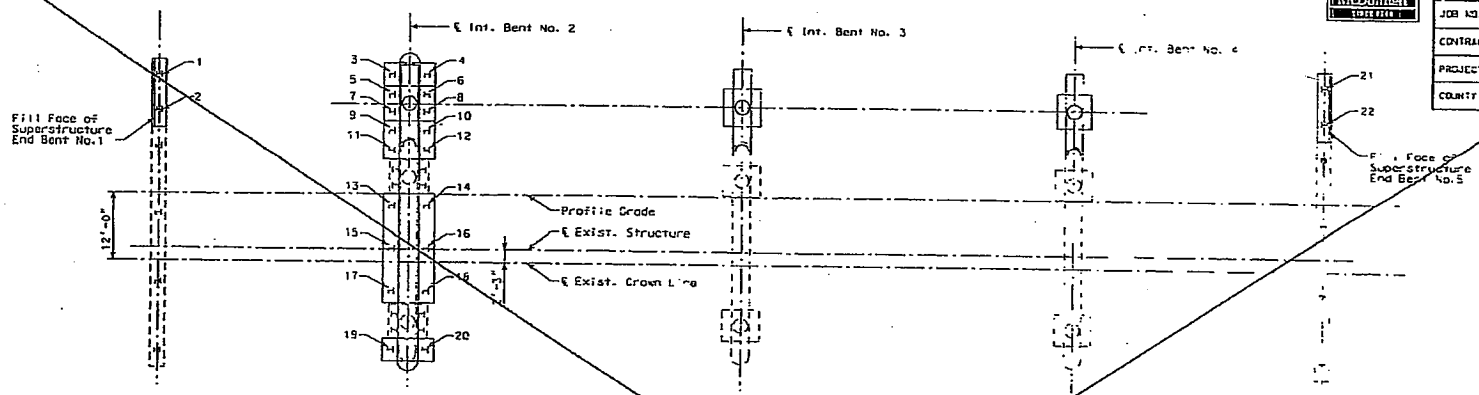
CONTRACT ID.

PROJECT NO.

COUNTY JACKSON

DATE

Burns & McDonnell



PART PLAN SHOWING PILE NUMBERING FOR RECORDING "AS BUILT PILE" DATA

"AS BUILT PILE" DATA

PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED BEARING (TONS)	REMARKS
			END BENT NO. 1
1			
2			
			INT. BENT NO. 2
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
			END BENT NO. 5
7			
8			

NOTE: INDICATE IN REMARKS COLUMN:
A.) IF PILING WERE DRIVEN TO PRACTICAL REFUSAL
B.) PILE BATTER IS OTHER THAN SHOWN ON BENT DETAIL SHEET.
C.) TYPE OF PILING USED.

NOTE: THIS SHEET TO BE COMPLETED BY MODOT CONSTRUCTION PERSONNEL.

Detailed Feb. 2008
Checked Mar. 2008

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

Sheet No. 34 of 34

Deleted 11/21/08

A21164

March 2009						
Mo	Tu	We	Th	Fr	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April 2009						
Mo	Tu	We	Th	Fr	Sa	Su
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May 2009						
Mo	Tu	We	Th	Fr	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April 20 - April 26, 2009

Tuesday, April 21, 2009

Life Cycle Cost Analysis Technical Forum - St. Louis

Wednesday, April 22, 2009

12:30 PM - 01:30 PM DISCUSS PILE DRIVING FORMULAS
Location: F.O. Evaluation Room @ Central Laboratory
Chair: Marjorie A Frank

02:00 PM - 03:30 PM MTI-Geotech Quarterly Update with Erik and Ronaldo
Room: MLCN201W/Support Center@MODOT
Location: Central Lab--conference room 201
Chair: Jennifer L Harper

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)

____Use drilled shafts in lieu of planned structural piling.

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.