BRIDGE REPLACEMENT – PPCB
LETTING DATE
June 17, 2008
IBRC-C010(58)--8E-10

BUCHANAN COUNTY

IOWA DNR STORM WATER PERMIT

THIS PROJECT IS COVERED BY THE IOWA DEPARTMENT OF NATURAL RESOURCES NPDES GENERAL PERMIT NO. 2. THE CONTRACTOR SHALL CARRY OUT THE TERMS AND CONDITIONS OF GENERAL PERMIT NO. 2 AND THE STORM WATER POLLUTION PREVENTION PLAN WHICH IS PART OF THESE CONTRACT DOCUMENTS. REFER TO SECTION 2602 OF THE IDOT STANDARD SPECIFICATIONS FOR ADDITIONAL INFORMATION.

U.S. ARMY CORPS OF ENGINEERS PERMIT

THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT 14. A COPY OF THIS PERMIT IS AVAILABLE FROM THE IOWA DOT OFFICE OF CONTRACTS UPON REQUEST. THE U.S. ARMY CORPS OF ENGINEERS RESERVES THE RIGHT TO VISIT THE SITE WITHOUT PRIOR NOTICE.

Iowa Department of Transportation

Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

SECONDARY ROAD SYSTEM

BUCHANAN COUNTY

IBRC-C010(58)--8E-10

BRIDGE REPLACEMENT – PPCB

136th STREET OVER
EAST BRANCH BUFFALO CREEK

SCALES: As Noted

The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, plus General Supplemental Specifications; and applicable Supplemental Specifications, Developmental Specifications, and Special Provisions shall apply to construction on this project.

INDEX OF SHEETS

105-3
10-18-05

MILEAGE SUMMARY

105-1
08-27-84

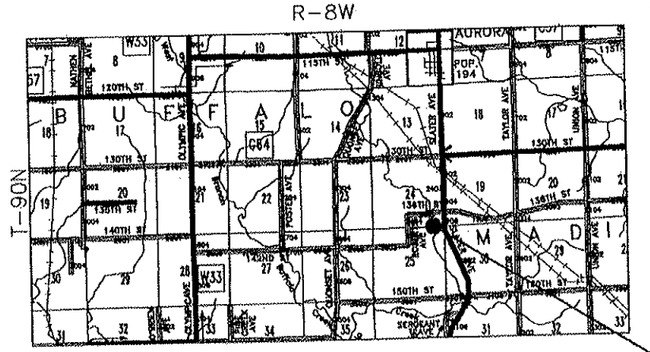
DIV.	LOCATION	LIN. FT.	MILES
1	136TH STREET STA 46+50 TO 53+25	675.0	0.128
	TOTAL	675.0	0.128

DESIGN SPEED: 40 MPH

TRAFFIC CONTROL PLAN

THIS ROAD SHALL BE CLOSED DURING CONSTRUCTION. ALL TRAFFIC CONTROL DEVICES, PROCEDURES, AND LAYOUTS WITHIN THE LIMITS OF THIS PROJECT SHALL CONFORM TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS, (MUTCD) AS ADOPTED BY THE DEPARTMENT PER 761 OF THE IOWA ADMINISTRATIVE CODE (IAC), CHAPTER 130." THE CONTRACTOR SHALL FURNISH TRAFFIC CONTROL INCLUDING BARRICADES AND SIGNS IN ACCORDANCE WITH TC252 AND THE MUTCD. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DETOUR SIGNING. CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN ALL NECESSARY TRAFFIC CONTROL DEVICES ON A 24 HOUR PER DAY, 7 DAYS A WEEK BASIS DURING THE CONSTRUCTION PERIOD. CONTRACTOR TO PROVIDE 24 HOUR CALL NUMBER FOR REPAIR OF DEFICIENCIES.

IOWA ONE CALL 1-800-292-8989



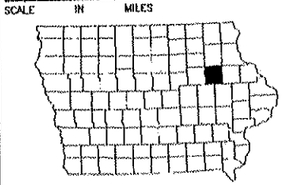
SECTION 24

B.O.P. STATION 46+50
E.O.P. STATION 53+25
FHWA STRUCTURE NO. 083670

APPROX. SCALE:

SCALE 0 1 2 IN MILES

LOCATION MAP



IIW ENGINEERS & SURVEYORS, P.C.
4151 PENNSYLVANIA AVE. DUBUQUE, IA 52003 (563) 556-2464

13/KGH

AADT 30 V.P.D. 2005
AADT 60 V.P.D. 2015

Ellen Duffney
Ralph Kramer
Michael D. Fenelon
APPROVED
BOARD OF SUPERVISORS

APPROVED
COUNTY ENGINEER DATE 3/24/08

BUCHANAN COUNTY

STRUCTURAL DESIGN

LICENSED PROFESSIONAL ENGINEER
Dean G. Bierwagen
11566
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Date 03-08

Dean G. Bierwagen
Printed or Typed Name

My license renewal date is December 31, 2008

Pages or sheets covered by this seal: 9-24

LICENSED PROFESSIONAL ENGINEER
DENNIS F. WAUGH
8909
IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA

FOR IIW ENGINEERS AND SURVEYORS P.C.

DENNIS F. WAUGH 3/24/08
DENNIS F. WAUGH DATE

PE 8909 12/31/2009
LICENSE # RENEWAL DATE

PAGES OR SHEETS COVERED BY THIS CERTIFICATION: 1-8

DESIGNED BY: TRACED BY:
DETAILED BY: CHECKED BY:

PROJECT NUMBER	IBRC-C010(58)--8E-10	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		IOWA		07	1	

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IBRC--CO10(58)--8E--10

ESTIMATED PROJECT QUANTITIES - IBRC-CO10(58)--8E-10

CONSTRUCTION USE ONLY	REF. NO.	ITEM CODE	BID ITEM DESCRIPTION	UNITS	BRIDGE	ROADWAY	TOTAL
	1	2101-0850001	CLEARING AND GRUBBING	ACRE		0.98	0.98
	2	2101-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY		5660	5660
	3	2104-2713020	EXCAVATION, CLASS 13, CHANNEL	CY		103	103
	4	2105-8425015	TOPSOIL, STRIP, SALVAGE, AND SPREAD	CY		1017	1017
	5	2312-8260051	GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE	TON		635	635
	6	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1		1
	7	2402-2720000	EXCAVATION, CLASS 20	CY	33		33
	8	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	139.8		139.8
	9	2404-7775000	REINFORCING STEEL	LB	26219		26219
	10	2407-0550001	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, ERECT AS PER PLAN	EACH	3		3
	11	2408-7800000	STRUCTURAL STEEL	LB	1287		1287
	12	2417-0330018	APRONS, SAFETY SLOPE, 18 IN. DIA	EACH		2	2
	13	2417-0330024	APRONS, SAFETY SLOPE, 24 IN. DIA.	EACH		4	4
	14	2417-1040018	CULVERT, CORRUGATED METAL ENTRANCE PIPE, 18 IN. DIA.	LF		121	121
	15	2417-1040024	CULVERT, CORRUGATED METAL ENTRANCE PIPE, 24 IN. DIA.	LF		90	90
	16	2501-0201057	PILES, STEEL, HP 10 X 57	LF	640		640
	17	2501-5476057	CONCRETE ENCASEMENT OF STEEL H PILES, HP 10 X 57 (P10A TYPE 3)	LF	88		88
	18	2505-4008200	INSTALLATION OF GUARDRAIL	LF		462.5	462.5
	19	2505-4021762	GUARDRAIL, TERMINAL, BEAM, FLARED, RE-76	EACH		4	4
	20	2507-3250005	ENGINEERING FABRIC	SY		463	463
	21	2507-6800061	REVETMENT, CLASS E, RIPRAP	TON		347	347
	22	2518-6910000	SAFETY CLOSURE	EACH		4	4
	23	2528-8445110	TRAFFIC CONTROL	LS		1	1
	24	2533-4980005	MOBILIZATION	LS		1	1
	25	2547-0000100	TEMPORARY STREAM ACCESS	LS		1	1
	26	2601-2634100	MULCHING	ACRE		0.63	0.63
	27	2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING	ACRE		0.63	0.63
	28	2602-0000020	SILT FENCE	LF		190	190
	29	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF		125	125
	30	2602-0000060	REMOVAL OF SILT FENCE	LF		190	190
	31	2602-0000070	REMOVAL OF SILT FENCE FOR DITCH CHECKS	LF		125	125
	32	2602-0000090	CLEAN OUT OF SILT FENCE	LF		95	95
	33	2602-0000100	CLEAN OUT OF SILT FENCE FOR DITCH CHECKS	LF		65	65

REF. NO.	DATA BELOW IS FOR INFORMATION ONLY AND NOT CONSTITUTE A BASIS FOR EXTRA WORK ORDER REQUESTS ESTIMATE REFERENCE INFORMATION
1	INCLUDES AREA WITHIN CONSTRUCTION LIMITS, EXCEPT FOR EXISTING ROADWAY, ON THE EAST SIDE OF THE STRUCTURE
2	WEST OF BRIDGE: VOLUME INCLUDES 1373 CY CUT (0% SHRINKAGE) AND 2205 CY OF FILL (30% SHRINKAGE) AS SHOWN ON PLAN CROSS-SECTIONS. EAST OF BRIDGE: VOLUME INCLUDES 426CY CUT (0% SHRINKAGE) AND 3455 CY OF FILL (30% SHRINKAGE) AS SHOWN ON PLAN CROSS-SECTIONS. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL MATERIAL FOR THIS PROJECT.
3	WEST OF STREAM: VOLUME OF CLASS 13 CHANNEL EXCAVATION IS 79 CY CUT (0% SHRINKAGE) AND 0 CY FILL (30% SHRINKAGE). EAST OF STREAM: VOLUME OF CLASS 13 CHANNEL EXCAVATION IS 24 CY CUT (0% SHRINKAGE) AND 0 CY FILL (30% SHRINKAGE) ALL CLASS 13 EXCAVATION, CHANNEL MOVED TO OR WITHIN THIS PROJECT SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM.
5	INCLUDES SURFACING OF DRIVEWAYS
6	EXISTING BRIDGE IS A 64' LONG BY 24' WIDE PONY TRUSS ON HIGH ABUTMENTS. THE EXISTING STRUCTURE BECOMES THE PROPERTY OF THE CONTRACTOR ONCE IT IS REMOVED. REMOVE EXISTING ABUTMENTS TO A POINT 12" BELOW THE BOTTOM OF THE PROPOSED GRADE ADJACENT TO THE EXISTING ABUTMENT.
7	ALL BACKFILL BEHIND ABUTMENTS BETWEEN WINGS SHALL BE GRANULAR BACKFILL. THE REMAINDER OF ABUTMENT EXCAVATION IS TO BE BACKFILLED WITH SUITABLE MATERIAL.
8	STRUCTURAL CONCRETE INCLUDES THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), INCLUDES COST OF ALL PREFORMED EXPANSION JOINT FILLER REQUIRED, INCLUDES CERTIFIED PLANT INSPECTIION.
10	BEAMS SHALL BE PROVIDED BY BUCHANAN COUNTY. ITEMS TO INCLUDE ALL COST TO REMOVE THE BEAMS FROM THE TRUCK AND ERECT ON THE BRIDGE. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED BY PLACEMENT. SEE SHEET 20-23 (WHICH ARE PROVIDED FOR INFORMATION ONLY) FOR BEAM DETAILS AND NOTES ON THIS SHEET.
16	REFER TO STANDARD P10A REVISION DATE 09/06.
17	INCLUDES CERTIFIED PLANT INSPECTION
20	PLACED AROUND ABUTMENTS AS SHOWN ON SITUATION PLAN
21	PLACED AROUND ABUTMENTS AS SHOWN ON SITUATION PLAN
26	ALL DISTURBED AREAS OUTSIDE STREAMBED WITHOUT STONE SURFACING
27	ALL DISTURBED AREAS OUTSIDE STREAMBED WITHOUT STONE SURFACING
28	TO BE PLACED AT THE TOE OF THE SLOPE ALONG DISTURBED SLOPES AS DIRECTED BY THE ENGINEER
29	TO BE PLACED IN PROPOSED DITCH AS DIRECTED BY THE ENGINEER
30	IF STABILIZATION IS NOT COMPLETE PRIOR TO CLOSE OF PROJECT, COUNTY WILL REMOVE SILT FENCE
31	IF STABILIZATION IS NOT COMPLETE PRIOR TO CLOSE OF PROJECT, COUNTY WILL REMOVE SILT FENCE

STANDARD ROAD PLANS

105-4
10-16-07

The following Standard Road Plans shall be considered applicable to construction work on this project.

Number	Date	Sheets	Title
RC-17	10-16-07	2	SILT FENCE
RE-2A	01-12-99	1	FORMED STEEL "W" BEAM RAILING TERMINAL SECTIONS
RE-2B	04-03-01	1	FORMED STEEL BEAM RAILING TRANSITION AND TERMINAL SECTIONS (THRIE BEAM)
RE-12A	10-19-04	1	FORMED STEEL BEAM GUARDRAIL AND POSTS FOR BLOCKED-OUT GUARDRAIL (W-BEAM)
RE-12B	10-19-04	1	FORMED STEEL BEAM GUARDRAIL AND POSTS FOR BLOCKED-OUT GUARDRAIL (THRIE BEAM)
RE-47	04-17-07	1	TYPE 3 OBJECT MARKER
RE-48A	10-19-04	1	DETAILS OF MARKER AND DELINEATOR PLACEMENT (AT BRIDGES)
RE-76	10-16-07	1	GUARDRAIL TERMINAL (FLEAT-350)
RL-1A	10-03-00	1	DETAILS OF EXCAVATION AND REBUILDING EMBANKMENTS
RL-8	10-16-07	1	RURAL ENTRANCE
RL-9	04-17-07	1	TEMPORARY EROSION CONTROL MEASURES
RL-14A	10-17-06	2	GUARDRAIL GRADING
RL-16	04-15-08	1	TEMPORARY STREAM CROSSING, CAUSEWAY, OR EQUIPMENT PAD
TC-252	04-15-08	2	ROAD CLOSURE

TABULATION OF SAFETY CLOSURES

Refer to Section 2518 of the Standard Specifications

STATION	CLOSURE TYPE Road Qty.	CLOSURE TYPE Hazard Qty.	REMARKS
46+50	1		BEGINNING OF PROJECT
49+49		1	WEST ABUTMENT
50+26		1	EAST ABUTMENT
53+25	1		END OF PROJECT

Design For
112'-4" X 24'-5" 0° SKEW
136th ST. OVER E. BRANCH BUFFALO CRK.
30'-7" End Spans 51'-2" Center Span
GENERAL NOTES
AND TABULATIONS
Station: 50+00 Date: 2007
BUCHANAN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION
Design Sheet No.:___Of___ File No.:_____ Design No.:_____

DESIGNED BY: _____ TRACED BY: _____
DETAILED BY: _____ CHECKED BY: _____

IIW ENGINEERS & SURVEYORS, P.C. 4155 PENNSYLVANIA AVE DUBUQUE, IA 52002 (563) 556-2464

BUCHANAN COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IBRC-C010(58)--8E-10	IOWA		07	2	

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IBRC-C010(58)--8E-10

STEEL BEAM GUARDRAIL AT BRIDGE END POST AND CONCRETE BARRIER

Refer to Standard Road Plans RE-48A, RE-64A, RE-64B, and RE-65B

108-8A
04-19-05 MOD.

Location						Layout Lengths					Materials Required						Delineators and Object Markers					Bid Items					
No.	① Direction of Traffic	End: A=Approach T=Trailing	Side: 0=Outside M=Median	Station			STS (18.75')	VT1	VF	VT2	ET Terminal (37.5')	Thrie Beam	Transition Section (6.25')	'W' Beam ② (VT1)+(VF)+(VT2)+(ET)	Posts ③ 6"x 8"x 7' with 6"x 8" Spacer Blocks	Posts ④ 6"x 8"x 6' with 6"x 8" Spacer Blocks	CRT Posts 6"x 8"x 6' with 6"x 8" Spacer Blocks (5)	Type	Delineator: Single White D-1W	Object Marker: Type 2 OM2-3YV	Object Marker: Type 3 OM-3L	Object Marker: Type 3 OM-3R	Installation of Guardrail (STS)+(VT1)+(VF)+(VT2)+(ET)	Anchorage and Terminal Systems: RE-69A	RE-69B	RE-69C	RE-76	Remarks
							Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	No.	No.	No.	No.		No.	No.	No.	No.	Lin. Ft.	No.	No.	No.	No.	
1	EB	A		50+00			–	–	–	–	37.5	68.75	6.25	37.5	3	1	5	2		3		1	112.5				1	SEE STRUCTURAL SHEET 11 OF 16
2	EB	T		50+00			–	–	–	–	37.5	68.75	6.25	37.5	3	1	5	2		3	1		112.5				1	SEE STRUCTURAL SHEET 11 OF 16
3	WB	A		50+00			–	–	12.5	–	37.5	68.75	6.25	37.5	3	3	5	2		4		1	125				1	SEE STRUCTURAL SHEET 11 OF 16
4	WB	T		50+00			–	–	–	–	37.5	68.75	6.25	37.5	3	1	5	2		3	1		112.5				1	SEE STRUCTURAL SHEET 11 OF 16

① Lane(s) to which the obstacle is adjacent.
② Includes (1) special 12.5' section of 'W' Beam, see RE-76.
③ (6) 6"x 8"x 7' posts required when RE-69C is specified.
④ The last two posts of the RE-76 Terminal section are included as part of that bid item.

01-20-84 204-2
All holes resulting from operations of the contractor, including removal of guardrail posts, fence posts, utility poles, or foundation studies, shall be filled and consolidated to finished grade as directed by the engineer to prevent future settlement. The voids shall be filled as soon as practical -- preferably the day created and not later than the following day. Any portion of the right-of-way or project limits (including borrow areas and operation sites) disturbed by any such operations shall be restored to an acceptable condition. This operation shall be considered incidental to other bid items in project.

04-15-08 213-1

It shall be the contractor's responsibility to provide waste areas or disposal sites for excess material (excavated material or broken concrete) which is not desirable to be incorporated into the work involved on this project.

It shall be the contractor's responsibility to ensure that areas (including haul roads) selected for waste or disposal not impact 1) culturally sensitive sites or graves or 2) wetlands or "Waters of the U.S.", including streams or stream banks below the "ordinary high water mark", without an approved U.S. Army Corps of Engineers Section 404 Permit.

No payment for overhaul will be allowed for material hauled to these sites. No material shall be placed within the right-of-way, unless specifically stated in the plans.

The contractor shall not disturb desirable grass areas and desirable trees outside the construction limits. The contractor will not be permitted to park or service vehicles and equipment or use these areas for storage of materials. Storage, parking and service area(s) will be subject to approval of the County Engineer.

Road contractor is to use due caution in working over and around all tile lines. Breaks in the tile line due to the contractor's carelessness are to be replaced at the contractor's expense without cost to Buchanan County. Any tile lines broken or disturbed by designated cut lines will be replaced as directed by the County Engineer and at the County's expense.

01-19-88 251-1
The contractor shall be responsible to maintain access to individual properties during construction.

Relocated access shall be completed to individual properties prior to removal of existing access.

If the permanent access cannot be completed prior to removal of the existing access, the contractor shall provide and maintain an alternate access. Temporary Granular Surfacing will be paid for as a contract item or by extra work.

GENERAL NOTES

ALL UNSALVAGEABLE MATERIAL AND RUBBLE GENERATED DURING THIS PROJECT SHALL BE DISPOSED OF OFF THE HIGHWAY RIGHT-OF-WAY IN A WASTE AREA PROVIDED BY THE CONTRACTOR AND APPROVED BY THE COUNTY ENGINEER. THE WASTED MATERIAL MUST NOT CREATE AN UNSIGHTLY CONDITION WHEN VIEWED FROM PUBLIC HIGHWAYS. REMOVALS AND DISPOSALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS. ALSO, ALL EXCESSIVE EXCAVATED MATERIAL AND UNSUITABLE MATERIAL FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF OFF SITE. ALL BORROW MATERIAL SHALL BE SUPPLIED BY THE CONTRACTOR AND APPROVED BY THE COUNTY ENGINEER.

NO EXTRA PAYMENT IS ALLOWED FOR COLD WEATHER PROTECTION DURING CONSTRUCTION. WORKING DAYS WILL BE CHARGED OVER THE WINTER.

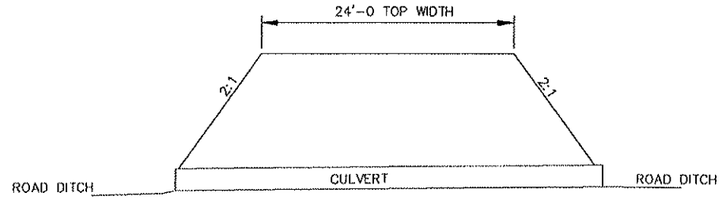
WHERE PUBLIC UTILITY FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNERS OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL AFFORD ACCESS TO THESE FACILITIES FOR NECESSARY MODIFICATION OF SERVICES. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE, AND TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID DAMAGE THERE TO. NO CLAIMS FOR ANY INTERFERENCE, DELAY, OR ANY AND ALL DAMAGES CAUSED BY SUCH WORK WILL BE GRANTED.

BUCHANAN COUNTY WILL PROVIDE THE CONSTRUCTION STAKING FOR USE BY THE CONTRACTOR.

SCRAPE SAMPLE WAS TAKEN FROM THIS BRIDGE TO GET AN INDICATION OF THE EXISTENCE OF THE LEVEL OF TOTAL CHROMIUM AND TOTAL LEAD. ANALYSIS OF THE TOTAL LEAD ON THE SAMPLE WAS 12700 PARTS PER MILLION (PPM). ANALYSIS OF THE TOTAL CHROMIUM ON THIS SAMPLE WAS 50.6 PPM. THESE ANALYSIS SHOW THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS. LEVELS INDICATED BY THESE TESTS COULD CREATE CONDITIONS ABOVE REGULATORY LIMITS FOR HEALTH & SAFETY REQUIREMENTS. NO OTHER CONSTITUENTS WERE ANALYZED. THE BIDDER SHOULD NOT RELY ON THE DEPARTMENT'S TESTING AND ANALYSIS FOR ANY PURPOSE OTHER THAN AS AN INDICATION OF THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS.

ASBESTOS SAMPLING WAS CONDUCTED FOR THIS STRUCTURE AND NONE WAS DETECTED.

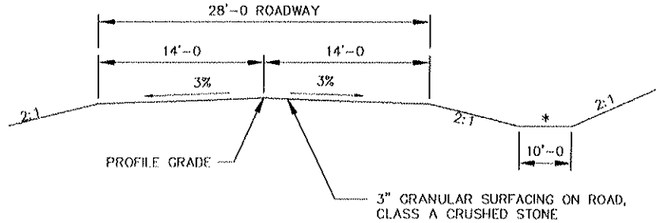
IF ARCHAEOLOGICAL MATERIALS ARE ENCOUNTERED DURING THE CONSTRUCTION PHASE OF THIS PROJECT, THE OFFICE OF LOCATION AND ENVIRONMENT (IDOT) MUST BE CONTACTED IMMEDIATELY SO THE PROPER AUTHORITIES CAN BE NOTIFIED ACCORDING TO THE EXISTING FEDERAL REGULATIONS AND STATE PROCEDURES. ADDITIONALLY, IT SHOULD BE NOTED THAT FINDINGS AND RECOMMENDATIONS FOR CLEARANCE FOR FURTHER TESTING CANNOT BE CONSIDERED FINAL UNTIL CONCURRENCE IS RECEIVED FROM THE STATE HISTORIC PRESERVATION OFFICER.
PHONE: OFFICE OF LOCATION AND ENVIRONMENT (515) 239-1225
DISTRICT LOCAL SYSTEMS (319) 364-0235.



N.T.S.

DRIVEWAY / CULVERT TABULATION

LOCATION	SIZE CULVERT	LF CMP	REMARKS
47+73 RT	24"	43'	
47+73 LT	24"	47'	
52+00 RT	18"	121'	UNDER BOTH DRIVES
52+85 LT			



N.T.S.

STA. 46+50 TO STA. 53+25

*DITCH GRADES NOTED ON CROSS SECTIONS

TRANSITION TO EXISTING WIDTH OF ROADWAY FROM STATION 46+50 TO 47+00 AND FROM STATION 52+75 TO STATION 53+25 AS SHOWN ON THE CROSS SECTIONS

Design For
112'-4" X 24'-6" 0° SKEW
136th ST. OVER E. BRANCH BUFFALO CRK.
30'-2" End Spans (Concrete Slab) 52'-0" Center Span (PI Beam)
GENERAL NOTES AND TYPICAL SECTIONS
Station: **50+00** Date: **2007**
BUCHANAN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION
Design Sheet No.:____Of____ File No.:_____Design No.:_____

DESIGNED BY: _____ TRACED BY: _____
DETAILED BY: _____ CHECKED BY: _____

IIW ENGINEERS & SURVEYORS, P.C. 4155 PENNSYLVANIA AVE. DUBUQUE, IA 52002 (563) 556-2464

BUCHANAN COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IBRC-C010(58)--8E-10	IOWA		07	3	

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IBRC--C010(58)---IE--10

POLLUTION PREVENTION PLAN

All contractors/subcontractors shall conduct their operations in a manner that minimizes erosion and prevents sediments from leaving the highway right-of-way. The prime contractor shall be responsible for compliance and implementation of the Pollution Prevention Plan (PPP) for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

1. SITE DESCRIPTION

This Pollution Prevention Plan (PPP) is for the construction of *136th Street over East Branch Buffalo Creek.*

This PPP covers approximately *1.27* acres with an estimated *1.27* acres being disturbed. The portion of the PPP covered by this contract has *1.27* acres disturbed.

The PPP is located in an area of *4* soil association(s) *Dickinson fine sandy loam, Clyde-Floyd complex, Spillville-Coland complex.* The estimated average NRCS runoff curve number for this PPP after completion will be *81.*

Refer to the project plans for locations of typical slopes, ditch grades, and major structural and non-structural controls. A copy of this plan will be on file at the project engineer's office. Runoff from this work will flow into *East Branch Buffalo Creek to Buffalo Creek to Wapsipinicon River to Mississippi River.*

POTENTIAL SOURCES OF POLLUTION:
Site sources of pollution generated as a result of this work relate to silts and sediment which may be transported as a result of a storm event. However, this PPP provides conveyance for other (non-project related) operations. These other operations have storm water runoff, the regulation of which is beyond the control of this PPP. Potentially this runoff can contain various pollutants related to site-specific land uses. Examples are:

Rural Agricultural Activities:
Runoff from agricultural land use can potentially contain chemicals including herbicides, pesticides, fungicides and fertilizers.

Commercial and Industrial Activities:
Runoff from commercial and industrial land use may contain constituents associated with the specific operation. Such operations are subject to potential leaks and spills which could be commingled with run-off from the facility. Pollutants associated with commercial and industrial activities are not readily available since they are typically proprietary.

2. CONTROLS

At locations where runoff can move offsite, silt fence shall be placed along the perimeter of the areas to be disturbed prior to beginning grading, excavation or clearing and grubbing operations. Vegetation in areas not needed for construction shall be preserved. As areas reach their final grade, additional silt fences, silt basins, intercepting ditches, sod flumes, letdowns, bridge end drains, and earth dikes shall be installed as specified in the plans and/or as required by the project engineer. This will include using silt fence as ditch checks and to protect intakes. Temporary stabilizing seeding shall be completed as the disturbed areas are constructed. If construction activity is not planned to occur in a disturbed area for at least 21 days, the area shall be stabilized by temporary seeding or mulching within 14 days. Other stabilizing methods shall be used outside the seeding time period.

This work shall be done in accordance with Section 2602 of the Standard Specifications. If the work involved is not applicable to any contract items, the work shall be paid for according to Article 1109.03 paragraph B.

As the work progresses, additional erosion control items may be required as determined by the engineer after field investigation. These may be items such as *let down structures, soil stabilization mats* and other appropriate measures shall be installed by contractor, as directed by the engineer. The contractor will complete the construction with the establishment of permanent perennial vegetation of all disturbed areas.

3. OTHER CONTROLS

Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.

APPROVED STATE OR LOCAL PLANS:
During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

4. MAINTENANCE

The contractor is required to maintain all temporary erosion control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. Cleaning of silt control devices shall begin when the features have lost 50% of their capacity.

5. INSPECTIONS

Inspections shall be made jointly by the contractor and the contracting authority every seven calendar days and after each rain event that is one half inch or greater. The contractor shall immediately begin corrective action on all deficiencies found. The findings of this inspection shall be recorded in the project diary. This PPP may be revised based on the findings of the inspection. The contractor shall implement all revisions. All corrective actions shall be completed within 3 calendar days of the inspection.

6. NON-STORM DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains), slope drains and bridge end drains. The velocity of the discharge from these features may be controlled by the use of patio blocks, Class A stone or erosion stone.

Design For
112'-4" X 24'-6" 0° SKEW
136th ST. OVER E. BRANCH BUFFALO CRK.
30'-2" End Spans (Concrete Slab) 52'-0" Center Span (PI Beam)
POLLUTION PREVENTION PLAN
Station: 50+00 Date: 2007
BUCHANAN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
Design Sheet No.:___Of___ File No.:_____ Design No.:_____

DESIGNED BY: _____ TRACED BY: _____
DETAILED BY: _____ CHECKED BY: _____

IIW ENGINEERS & SURVEYORS, P.C. 4135 PENNSYLVANIA AVE DUBUQUE, IA 52002 (563) 556-2464

BUCHANAN COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IBRC--C010(58)---IE--10	IOWA		07	4	

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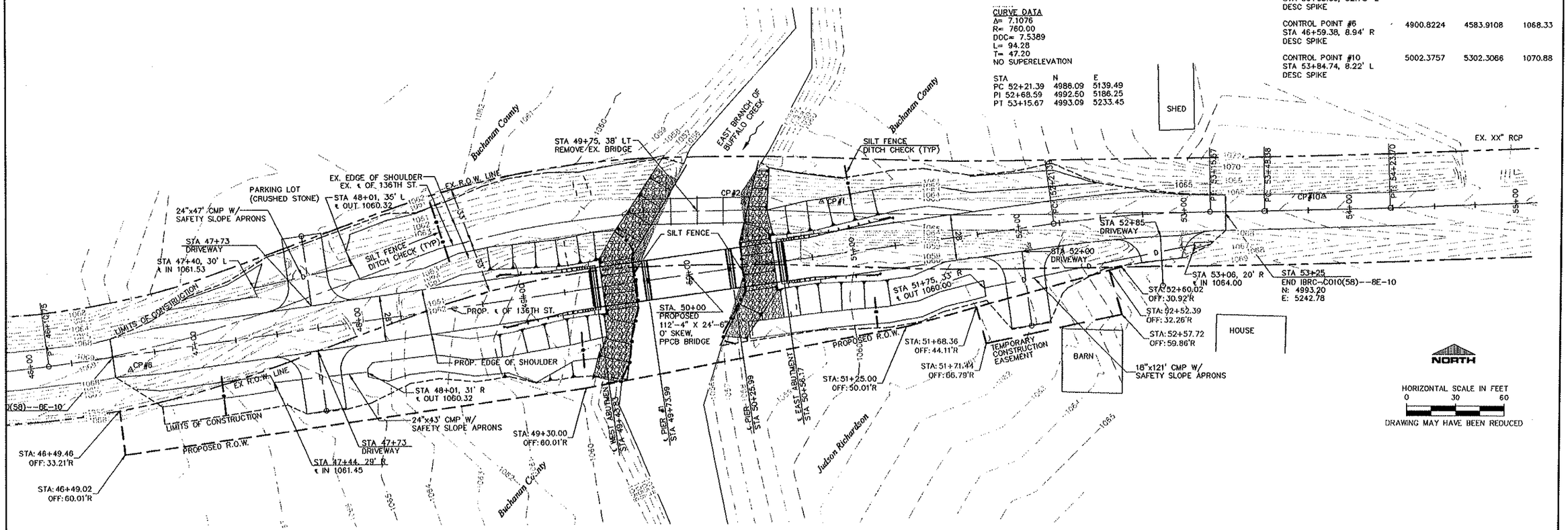
BENCHMARK INFORMATION
SAME AS SURVEY CONTROL

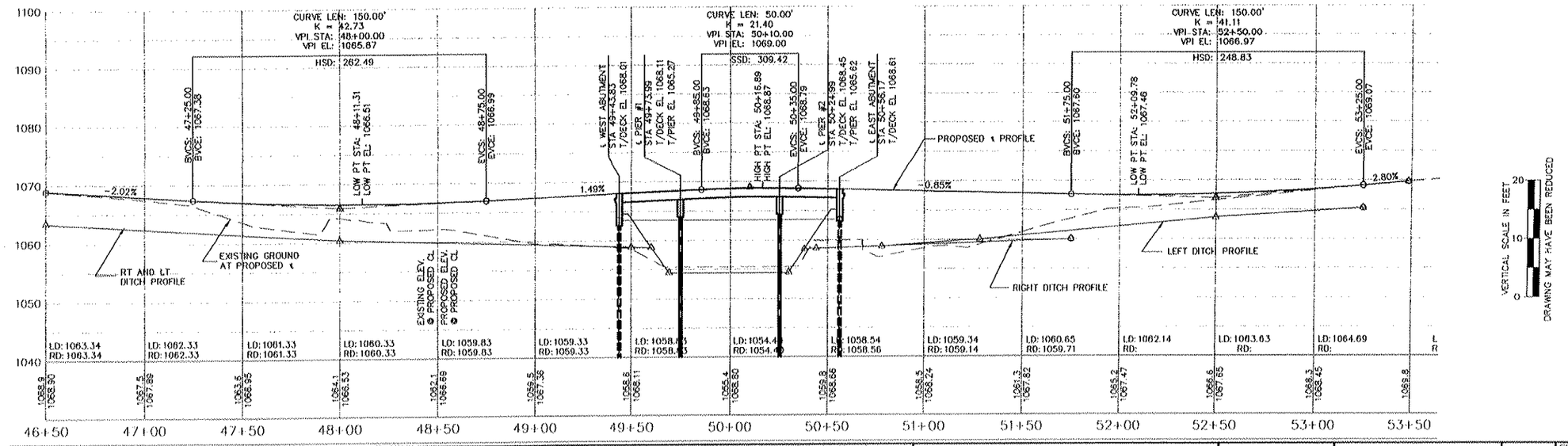
SURVEY CONTROL

	NORTHING	EASTING	ELEVATION
CONTROL POINT #1 STA 50+85.09, 32.75' L DESC SPIKE	5000.0000	5000.0000	1065.21
CONTROL POINT #6 STA 46+59.38, 8.94' R DESC SPIKE	4900.8224	4583.9108	1068.33
CONTROL POINT #10 STA 53+84.74, 8.22' L DESC SPIKE	5002.3757	5302.3066	1070.88

CURVE DATA
Δ= 7.1076
R= 760.00
DOC= 7.5389
L= 94.28
T= 47.20
NO SUPERELEVATION

STA	N	E
PC 52+21.39	4988.09	5139.49
PI 52+68.59	4992.50	5186.25
PT 53+15.67	4993.09	5233.45





DESIGNED BY:	TRACED BY:	IIW ENGINEERS & SURVEYORS, P.C.	4155 PENNSYLVANIA AVE. DUBUQUE, IA 52002 (563) 556-2464	BUCHANAN COUNTY	PROJECT NUMBER	IBRC-C010(58)--8E-10	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
DETAILED BY:	CHECKED BY:						IOWA		08	5	

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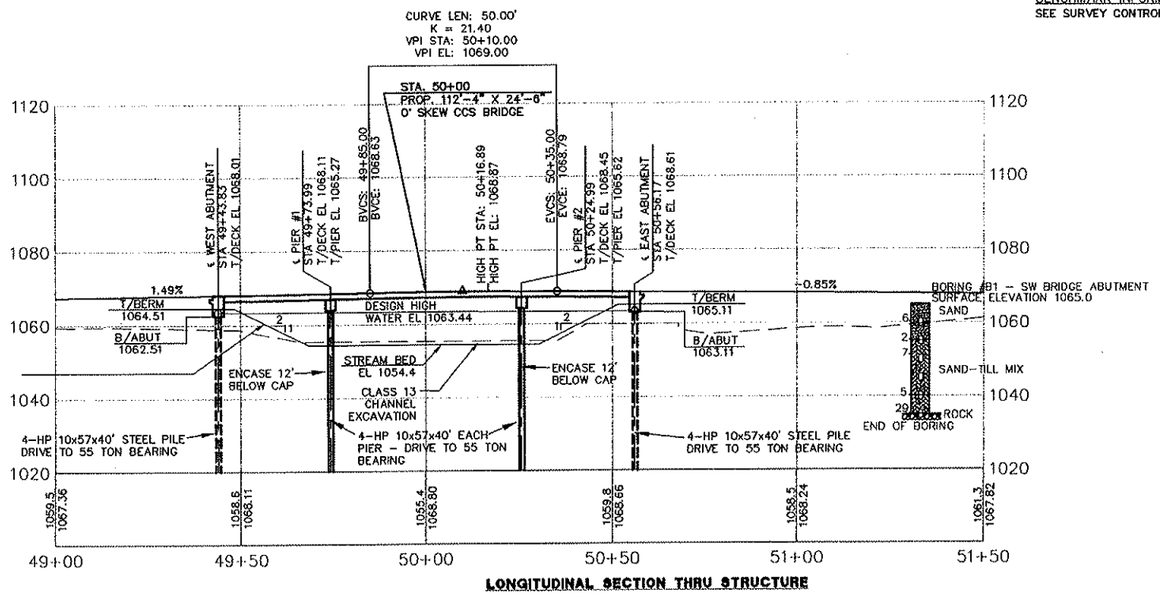
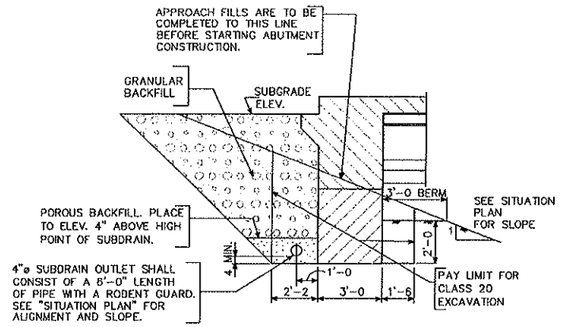
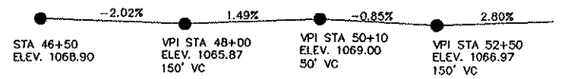
BENCHMARK INFORMATION
SEE SURVEY CONTROL NOTE SHEET D.01



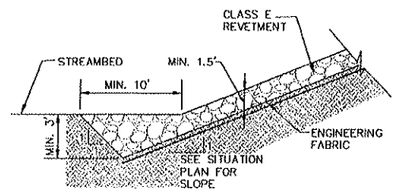
LONGITUDINAL SECTION THRU STRUCTURE



ABUTMENT BACKFILL DETAIL



PROPOSED GRADE ON 136TH ST.
NTS



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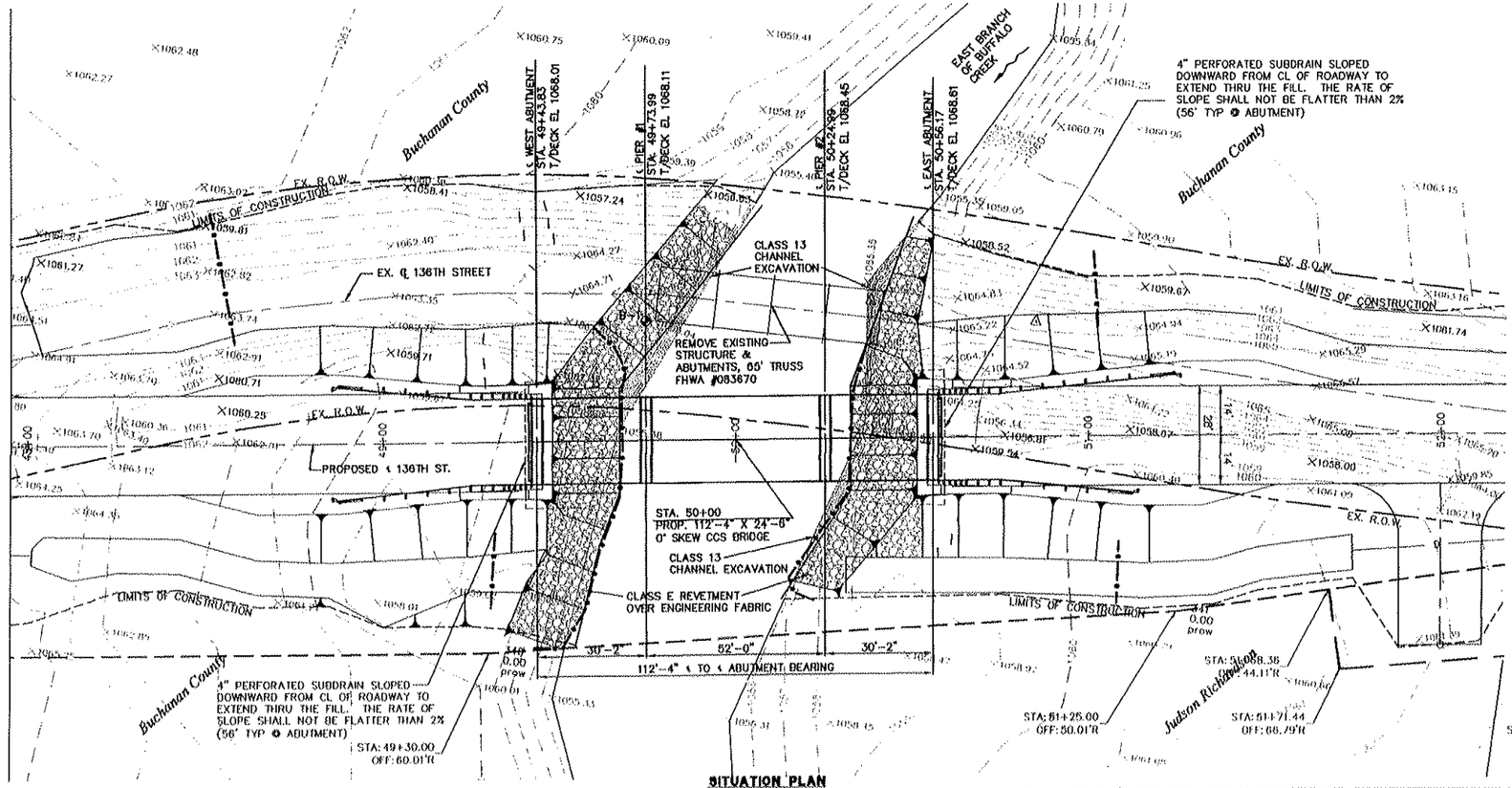

4" PERFORATED SUBDRAIN SLOPED DOWNWARD FROM CL OF ROADWAY TO EXTEND THRU THE FILL. THE RATE OF SLOPE SHALL NOT BE FLATTER THAN 2% (56' TYP ø ABUTMENT)

SITUATION PLAN

NORTH

0 20 40
SCALE: HORIZ AND VERT. EQUAL

LOCATION
BUCHANAN COUNTY
R8W T90N
SE 1/4 SECTION 24
BUFFALO TOWNSHIP
OVER EAST BRANCH OF BUFFALO CREEK

HYDRAULIC DATA

DRAINAGE AREA	24.0	SQ. MI.	
MAIN CHANNEL SLOPE		FT/MI	
DESIGN DISCHARGE	2350	CFS (10 YR)	
DESIGN HIGH WATER	1063.44	FT. ELEV.	
REACH SLOPE (LOCAL)	3.35	FT/MI	
BRIDGE FLOW AREA	701	SQ.FT. (10 YR)	
DESIGN VELOCITY	3.35	FPS (10 YR)	

Q50	3900	CFS	NATURAL STAGE	1065.17	FT.
Q100	4600	CFS	NATURAL STAGE	1065.82	FT.
QOVERTOPPING	5420	CFS	MIN. ROAD ELEV.	1067.36	FT.
Q500	6300	CFS	STAGE W/BACKWATER	1068.05	FT.
EXTREME H.W.	4350	CFS	LOCATION: DEBRIS ON DRIVEWAY NEAR BARN		

STAGE: 1065.5 FT. ELEV.
DATE: MAY 23, 2004

Design For
112'-4" X 24'-6" 0° SKEW
136th ST. OVER E. BRANCH BUFFALO CRK.
30'-2" End Spans (Concrete Slab) 52'-0" Center Span (PI Beam)

SITUATION PLAN
Station: 50+00 Date: 2008
BUCHANAN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION
Design Sheet No.: ___ Of ___ File No.: ___ Design No.: ___

DESIGNED BY: ___ TRACED BY: ___
DETAILED BY: ___ CHECKED BY: ___

IIW ENGINEERS & SURVEYORS, P.C.
4155 PENNSYLVANIA AVE.
DUBUQUE, IA 52002
(563) 556-2464

BUCHANAN COUNTY

PROJECT NUMBER	BRC-C010(58)--8E-10	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		IOWA		08	6	

IBRC-C010(58)--8E-10

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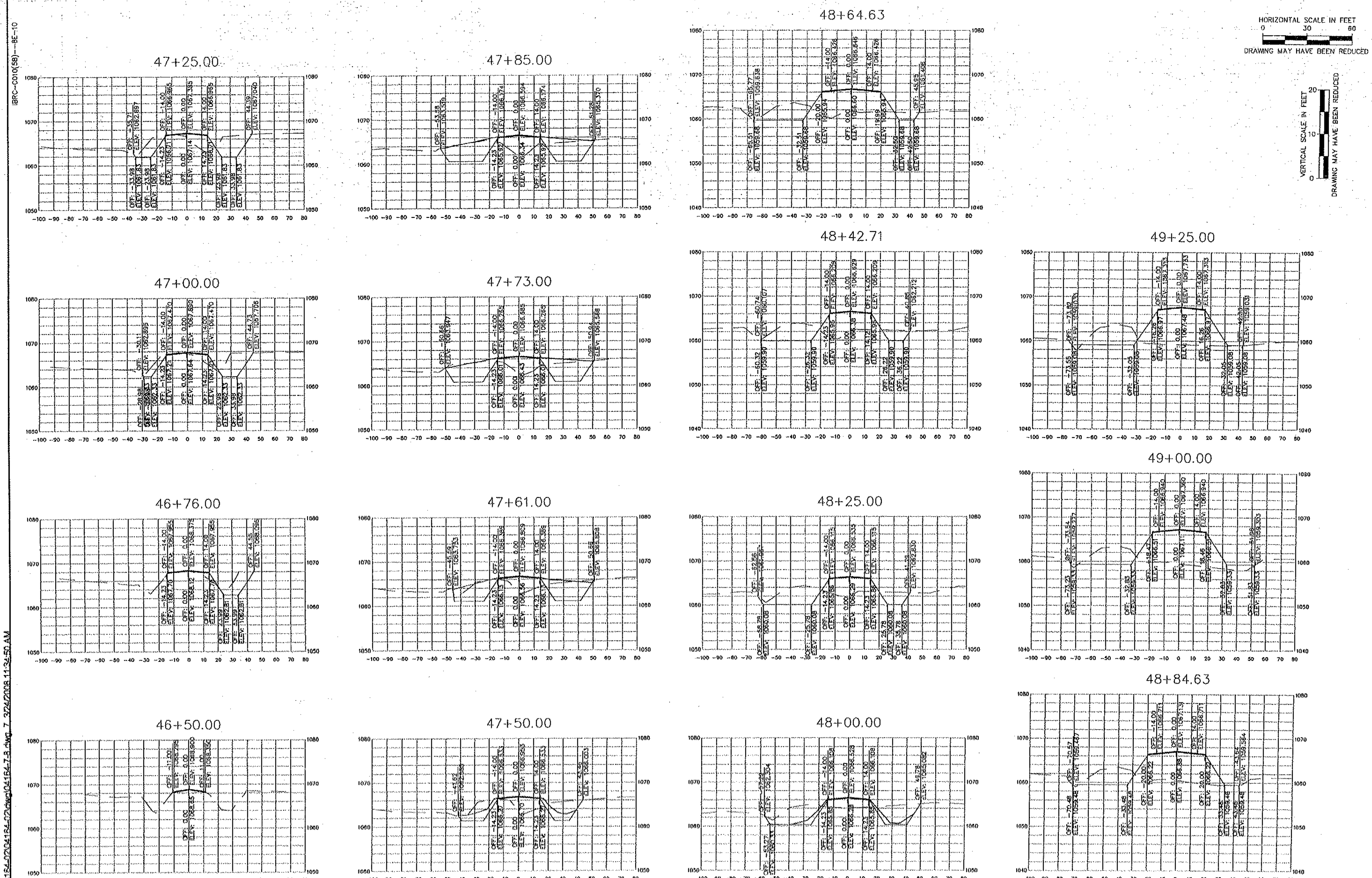
IBRC-C010(58)--8E-10



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DESIGNED BY:		TRACED BY:	
DETAILED BY:		CHECKED BY:	

HW ENGINEERS & SURVEYORS, P.C.
4155 PENNSYLVANIA AVE.
DUBUQUE, IA 52002
(563) 556-2464

BUCHANAN COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IBRC-C010(58)--8E-10	IOWA		08	7	

BRC-C010(58)--8E-10

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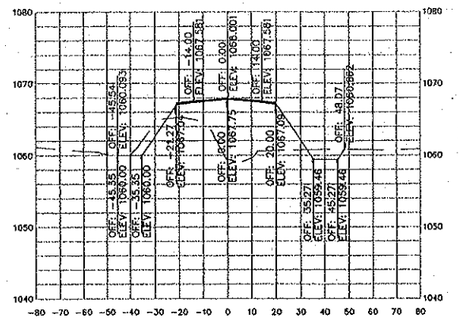

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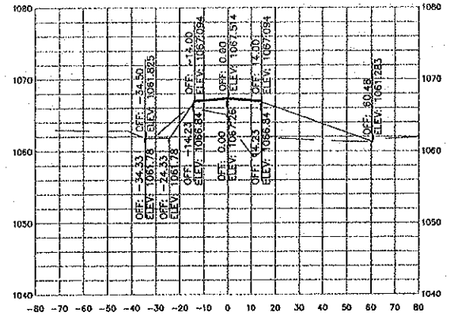

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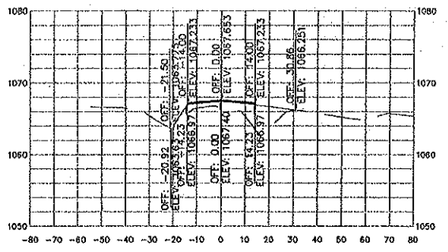
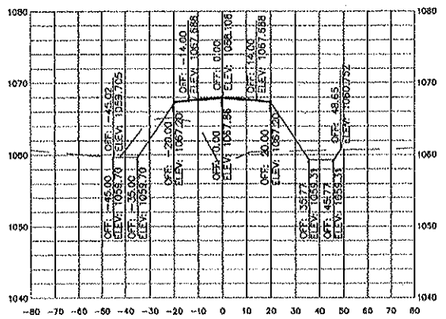


HORIZONTAL SCALE IN FEET
0 30 60
DRAWING MAY HAVE BEEN REDUCED

VERTICAL SCALE IN FEET
0 10 20
DRAWING MAY HAVE BEEN REDUCED

51+15.38



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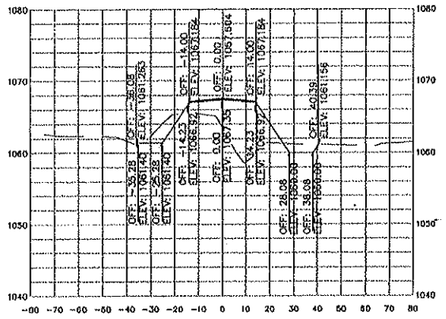

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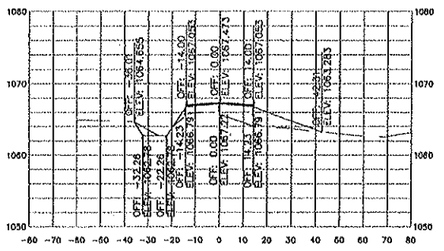

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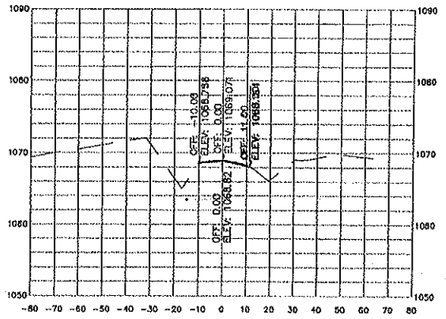

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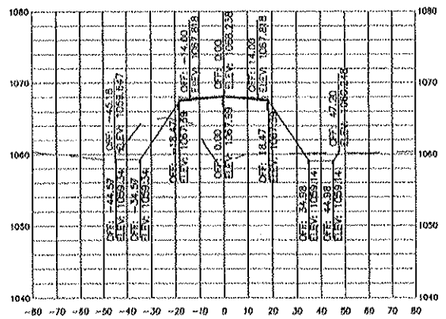

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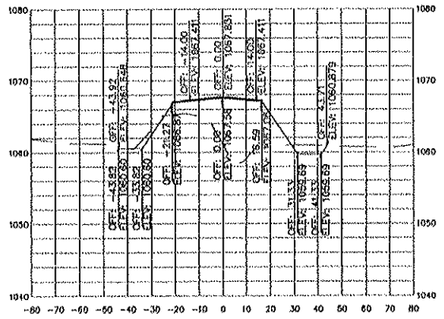

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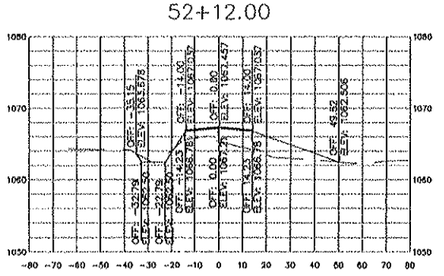

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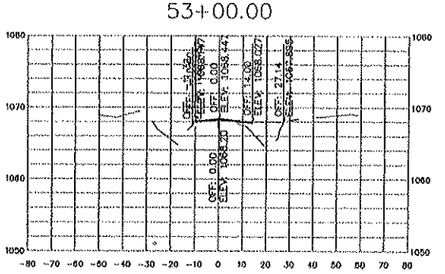

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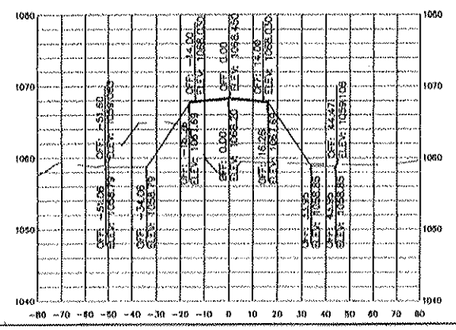

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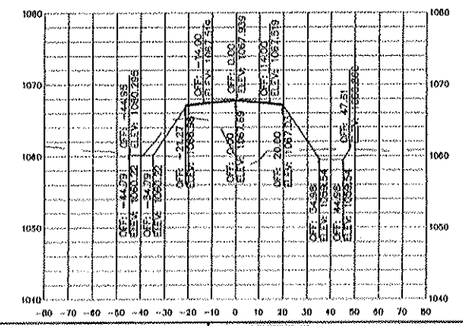

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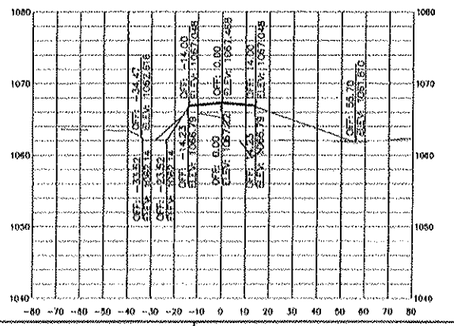

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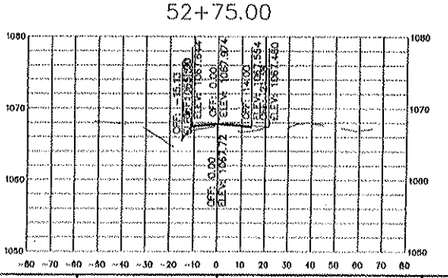

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DESIGNED BY:	TRACED BY:	HW ENGINEERS & SURVEYORS, P.C.	4155 PENNSYLVANIA AVE. DUBUQUE, IA 52002 (563) 556-2464	BUCHANAN COUNTY	PROJECT NUMBER	BRC-C010(58)--8E-10	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
DETAILED BY:	CHECKED BY:						IOWA		08	8	

ESTIMATED BRIDGE QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUANTITY
1	2402-2720000	EXCAVATION, CL 20	CY	33	
2	2403-0100010	STRUCT CONC (BRIDGE)	CY	139.8	
3	2404-7775000	REINFORC STEEL	LB	29,219	
4	2407-0550001	BEAMS, PRET PRESTR CONC, ERECT AS PER PLAN	EACH	3	
5	2408-7800000	STRUCTURAL STEEL	LB	1287	
6	2501-0201057	PILE, STEEL, HP 10X57, 16 @ 40'	LF	640	
7	2501-5476057	CONC ENCASE OF STEEL H PILE, HP 10X57	LF	88	

GENERAL NOTES (Cont):

THE CONTRACTOR SHALL VISIT THE SITE AND BE FAMILIAR WITH THE EXISTING CONDITIONS OF THE PROJECT. UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS OF UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE, WHICH MIGHT OCCUR DUE TO HIS FAILURE TO LOCATED AND PROTECT UNDERGROUND UTILITIES.

ACCESS SHALL BE MAINTAINED TO INDIVIDUAL PROPERTIES DURING CONSTRUCTION. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

ALL STRUCTURAL CONCRETE FOR BRIDGE DECK IS TO BE CLASS 'C'. SUBSTITUTION OF CLASS 'D' CONCRETE IS NOT ALLOWED.

THE BEAMS AND SLAB FOR THE CENTER SPAN ARE AN ULTRA HIGH STRENGTH CONCRETE CALLED 'DUCTAL' MANUFACTURED BY LAFARGE NORTH AMERICA, WINNIPEG, CANADA. THE BEAMS ARE BEING PURCHASED AND SUPPLIED TO THE JOB SITE UNDER A SEPARATE CONTRACT BETWEEN BUCHANAN COUNTY AND LAFARGE NORTH AMERICA. THE CONTRACTOR SHALL CONTACT BRUCE DAWSON OF LAFARGE NORTH AMERICA, WINNIPEG, CANADA PHONE NUMBER OFFICE (204)958-6377 AND CELL PHONE (204)797-8010 OR E-MAIL BRUCE.DAWSON@LAFARGE-NA.COM TO ARRANGE A TIME TO HAVE THE BEAMS SHIPPED TO THE JOB SITE.

UPON DELIVERY TO THE JOB SITE EACH BEAM SHALL BE JOINTLY INSPECTED BY THE BUCHANAN COUNTY ENGINEER, LAFARGE NORTH AMERICA, AND THE BRIDGE CONTRACTOR FOR STRUCTURAL INTEGRITY AND ANY DAMAGE THAT MAY HAVE BEEN CAUSED BY SHIPMENT. ONCE ACCEPTED BY THE BUCHANAN COUNTY ENGINEER THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE BEAMS DURING CONSTRUCTION AT THE BRIDGE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OR REPAIR OF ANY BEAMS DAMAGED DURING THE CONSTRUCTION AT THE BRIDGE SITE, WHICH SHALL INCLUDE THE LIFTING, AND PLACEMENT ON THE BRIDGE SEATS.

GENERAL NOTES:

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 65 FT. STEEL TRUSS BRIDGE. THE EXISTING BRIDGE SUPERSTRUCTURE CONSISTS OF STEEL TRUSS, STEEL FLOOR BEAMS, AND TIMBER DECKING. THE REPLACEMENT BRIDGE SHALL BE A THREE SPAN 115 FT 4 IN WITH CONCRETE SLAB END SPANS AND A PRECAST ULTRA HIGH PERFORMANCE PI BEAM FOR THE CENTER SPAN.

THIS BRIDGE SUPERSTRUCTURE IS DESIGNED FOR HL-93 LOADING, PLUS 20 LBS. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE. THE BRIDGE SUBSTRUCTURE IS DESIGNED FOR HS-20 LOADING PLUS 20 LBS. PER SQUARE FOOT OF ROADWAY.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS $\frac{5}{8}$ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	BAR DESIGNATION
3	10
4	13
5	16
6	19
7	22
8	25
9	29
10	32
11	36

ALL COARSE AGGREGATE FOR STRUCTURAL CONCRETE SHALL BE CRUSHED LIMESTONE.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

SPECIFICATIONS:

DESIGN: SUBSTRUCTURE: AASHTO SERIES OF 2002.
SUPERSTRUCTURE: AASHTO LRFD SERIES OF 2007.
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2001, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002 AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SERIES OF 2007.

REINFORCING STEEL IN ACCORDANCE WITH STANDARD AASHTO SECTION 8 AND LRFD AASHTO SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH STANDARD AASHTO SECTION 8, AND LRFD AASHTO SECTION 5, f'c = 3,500 PSI.

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

EST. QUANTS. & GENERAL NOTES

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 9

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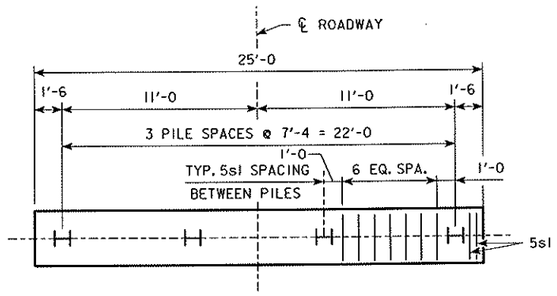
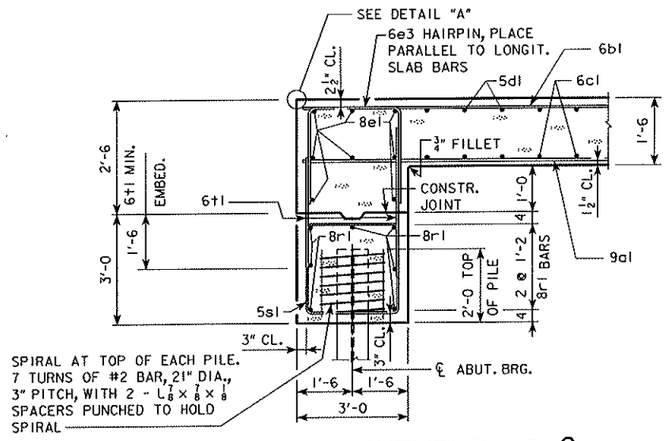
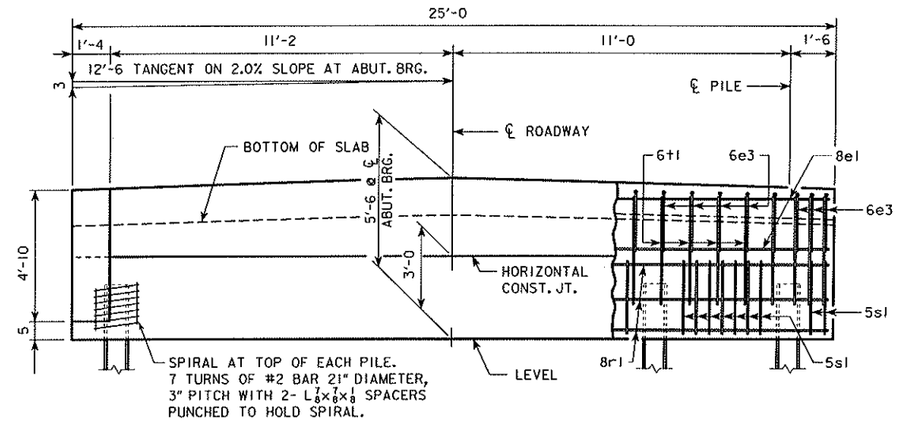


ABUTMENT PILE PLAN

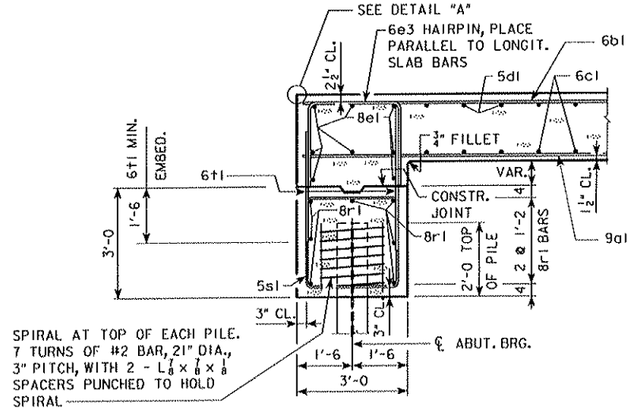
TABLE OF ABUTMENT ELEVATIONS		
LOCATION	WEST ABUT.	EAST ABUT.
BOTT. FTG. ELEV.	1062.42	1063.05



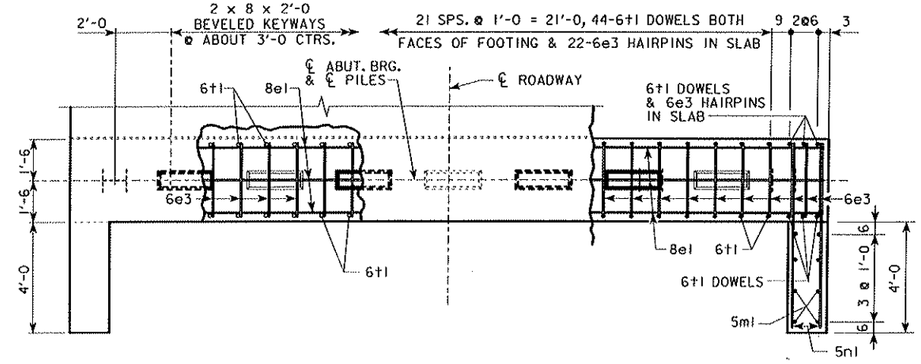
SECTION NORMAL TO ABUTMENT AT ℄



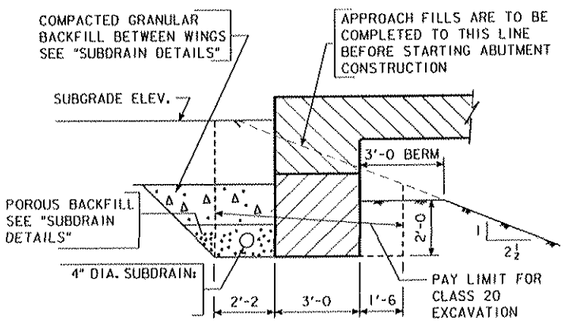
REAR ELEVATION ABUTMENT



SECTION NORMAL TO ABUTMENT AT RAIL



PLAN VIEW ABUTMENT NOTE: RAIL NOT SHOWN.



ABUTMENT EXCAVATION DETAILS

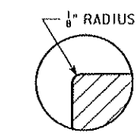
SECTION NORMAL TO ℄ ABUT. BRG.

ABUTMENT NOTES:

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

4 - HP10x57 STEEL BEARING PILING REQUIRED AT EACH ABUTMENT.

THE DESIGN BEARING FOR THE ABUTMENT PILES IS 55 TONS.



DETAIL "A"

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

ABUTMENT DETAILS

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

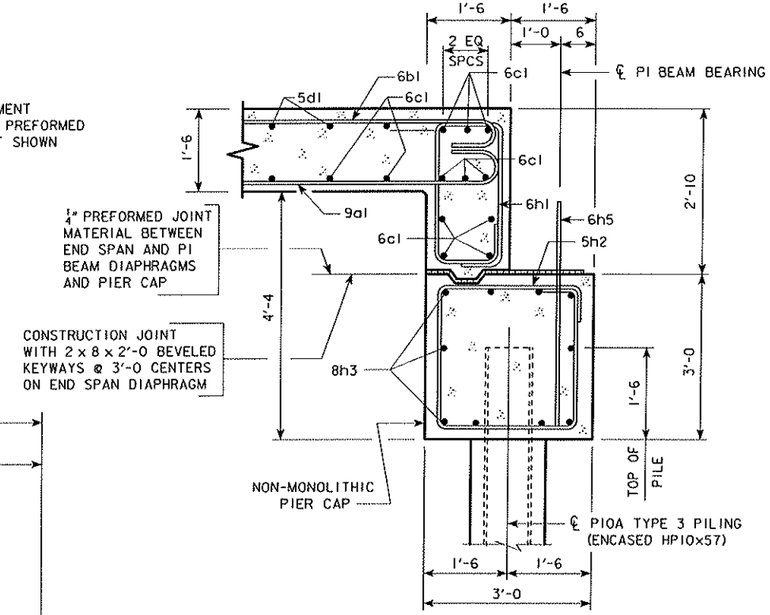
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 11 FILE NO. _____ DESIGN NO. _____

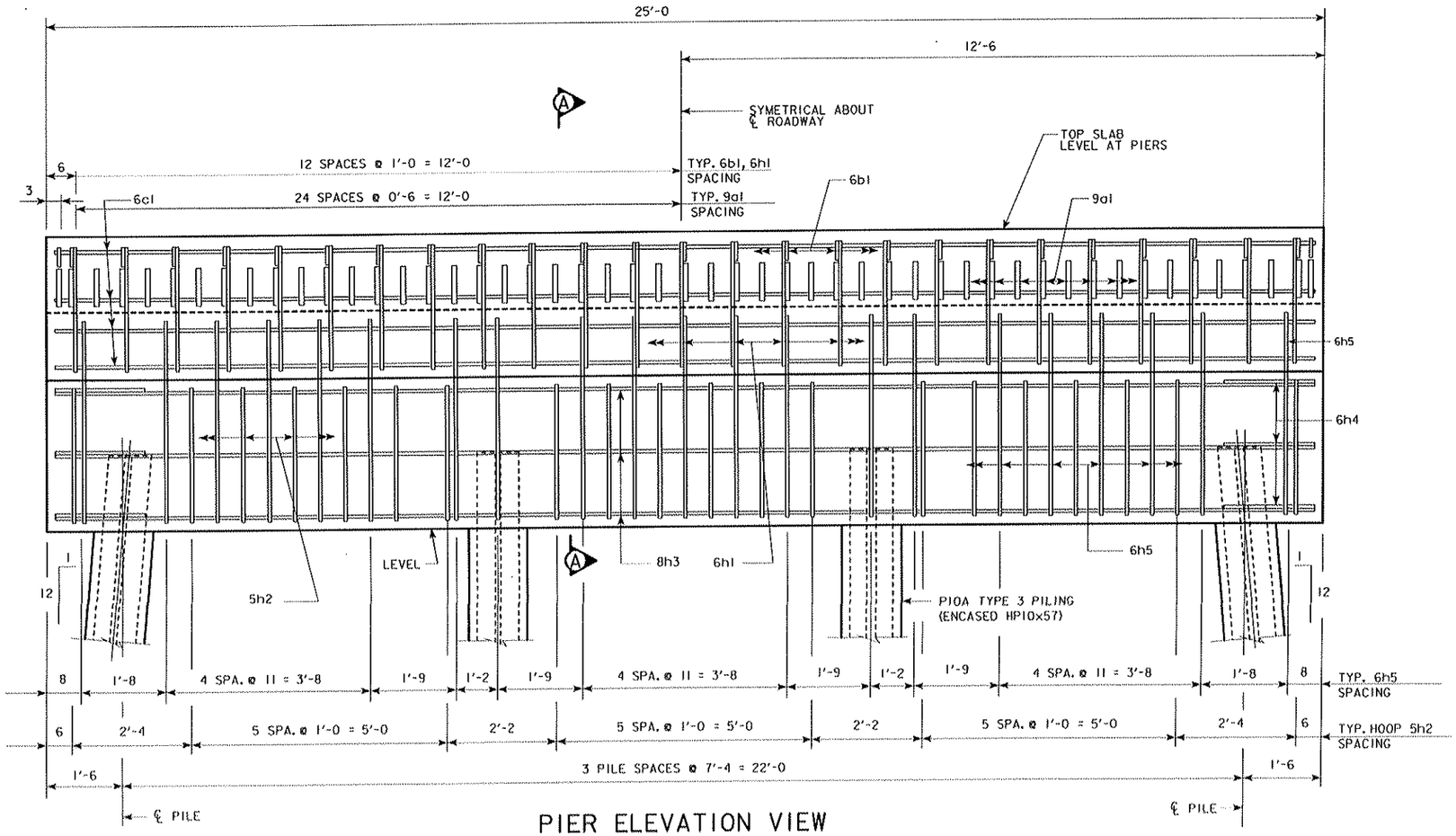
DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 10

07-MAY-2008 10:10 tsorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 10S002 \\ntpprtsvr2\BrgPDF

NOTE:
SEE SHEET 6 OF 16 FOR PLACEMENT OF THE PI BEAM BEARING AND $\frac{1}{4}$" PREFORMED JOINT MATERIAL, WHICH ARE NOT SHOWN



SECTION A-A
(PI BEAM & DIAPHRAGM NOT SHOWN)



PIER ELEVATION VIEW
(PI BEAM DIAPHRAGM NOT SHOWN)

TABLE OF PIER ELEVATIONS

LOCATION	WEST PIER	EAST PIER
TOP OF CAP	1065.27	1065.62
BOTTOM OF CAP	1062.27	1062.62

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

PIER DETAILS

STA. 50+00

MARCH, 2008

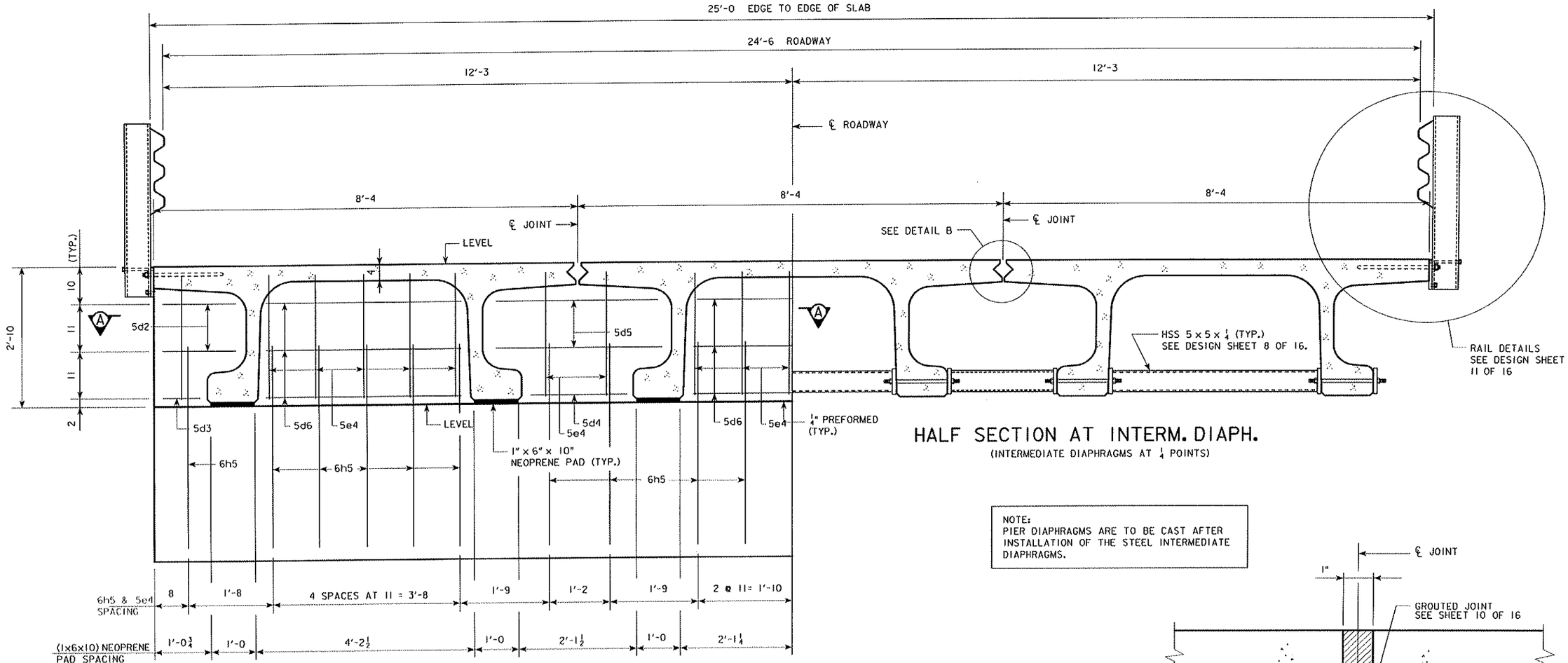
BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 11

07-MAY-2008 10:10 tsorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 10S003 \\ntpprtsvr2\BrgPDF

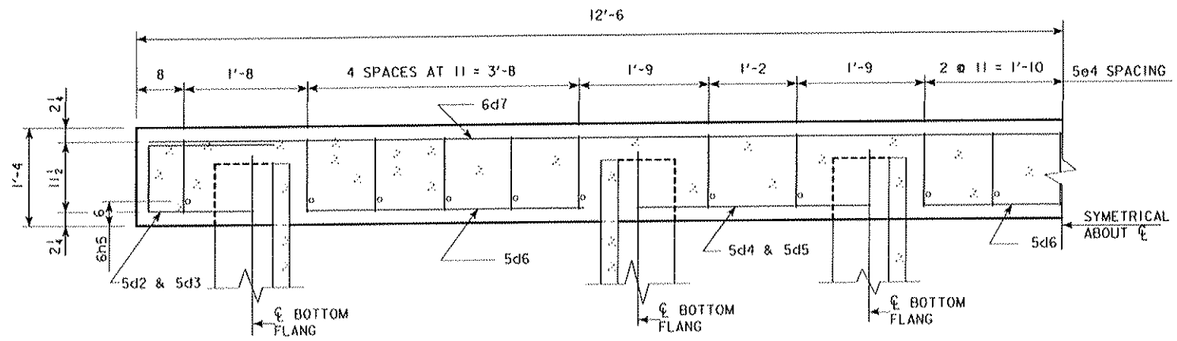


HALF SECTION AT INTERM. DIAPH.

(INTERMEDIATE DIAPHRAGMS AT ¼ POINTS)

HALF SECTION AT PI BEAM PIER DIAPHRAGM

(PILING NOT SHOWN)



SECTION A-A

(PILING NOT SHOWN)

NOTE:
PIER DIAPHRAGMS ARE TO BE CAST AFTER INSTALLATION OF THE STEEL INTERMEDIATE DIAPHRAGMS.

DETAIL B

(TYPICAL JOINT)

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

PI BEAM CROSS SECTION

STA. 50+00

MARCH, 2008

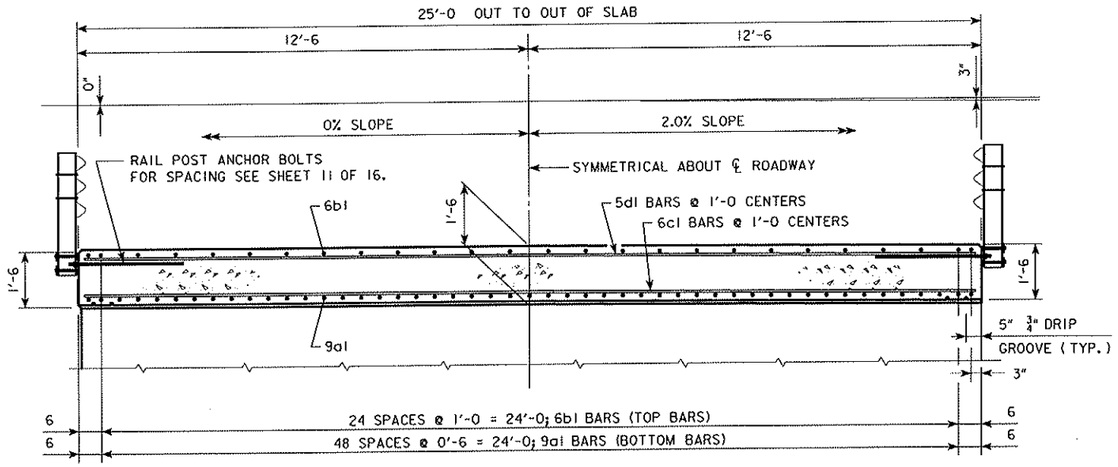
BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 12

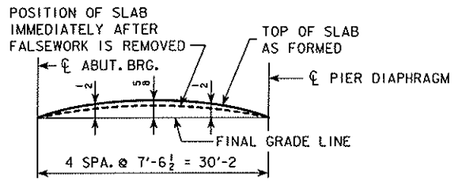
07-MAY-2008 10:10 tsorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 105004 \\ntpprtsvr2\BrgPDF



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
= 37.50 SQ. FT.

NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2½" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1½" CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON METAL BAR CHAIRS BEFORE CONCRETE IS PLACED.



FORM CAMBER DIAGRAM

THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FALSEWORK SETTLEMENT.

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

APPROACH SLAB DETAILS

STA. 50+00

MARCH, 2008

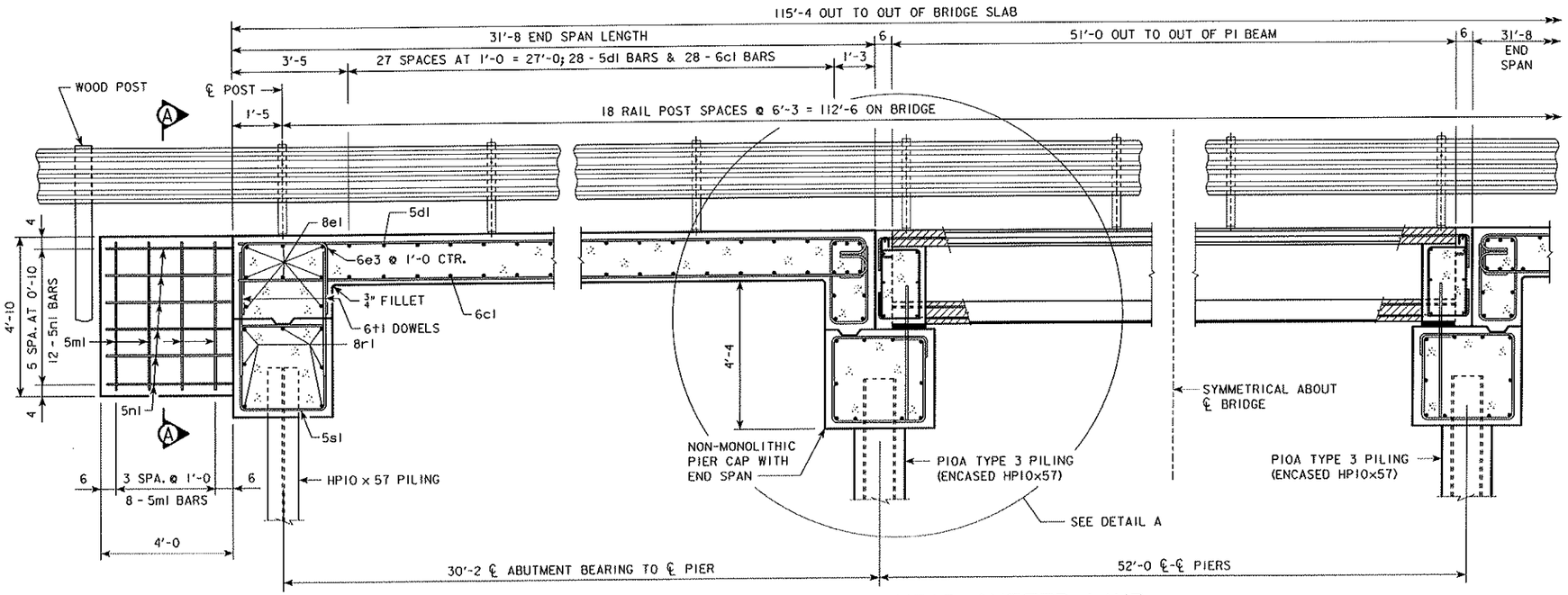
BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 13

07-MAY-2008 10:10 taorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 10S005 \\ntpprtsvr2\BrgPDF



PART LONGITUDINAL SECTION NEAR GUTTER LINE

SUPERSTRUCTURE NOTES:

THIS BRIDGE IS DESIGNED FOR HL-93 LOADING PLUS AN ALLOWANCE OF 20 POUNDS PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

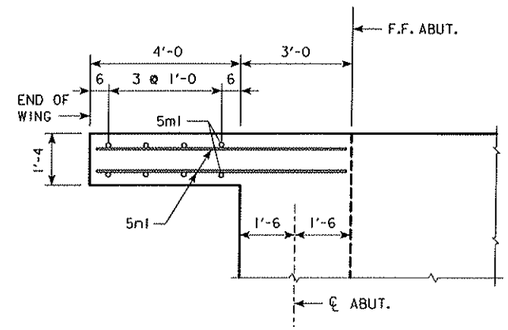
THE END SPAN SLABS AS SHOWN INCLUDES A $\frac{1}{2}$ INCH INTEGRAL WEARING SURFACE.

THE MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE. SEE "BAR CHAIR NOTE".

ALL REINFORCING SHALL BE GRADE 60.

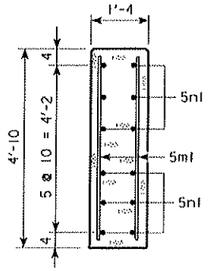
BAR CHAIR NOTE: (END SPANS)

TOP MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL METAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY. THE BOTTOM MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL METAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF METAL HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0 APART.



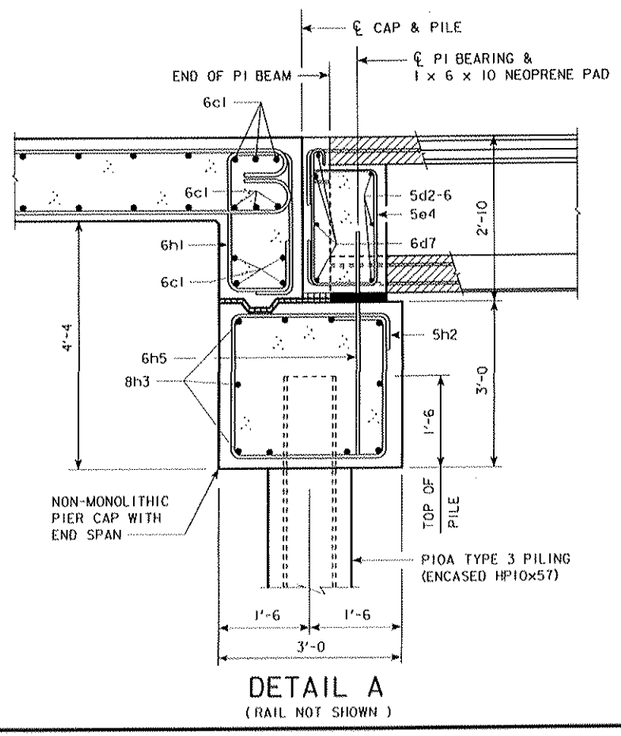
PART PLAN AT WING

(RAIL NOT SHOWN)



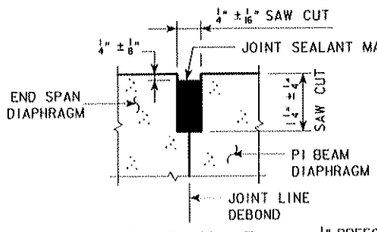
SECTION A-A

NOTE: 5ml & 5nl BARS ARE INCLUDED IN SUPERSTRUCTURE BAR LIST.

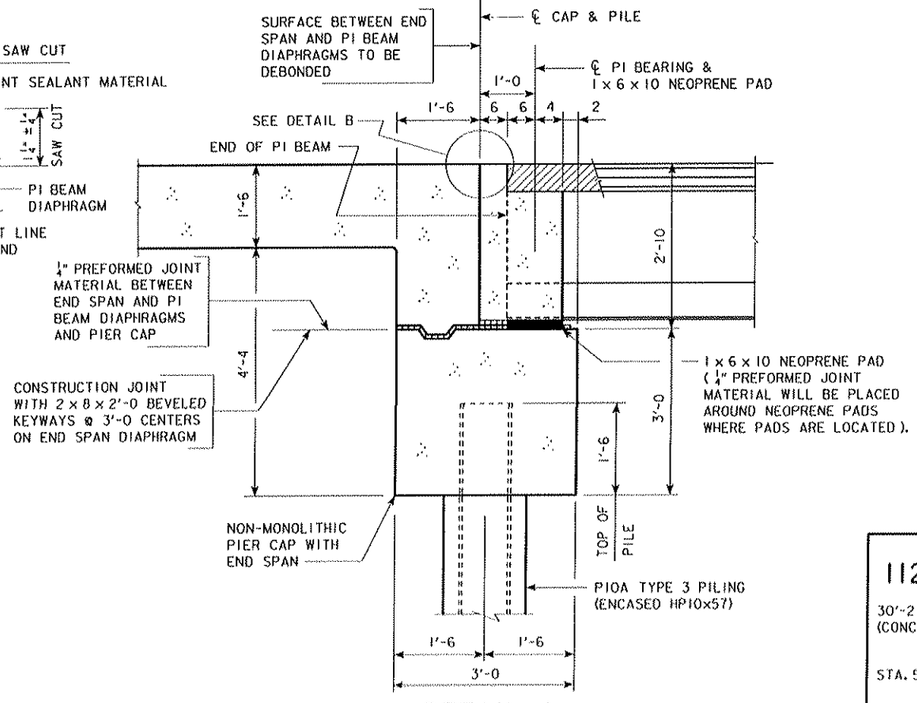


DETAIL A

(RAIL NOT SHOWN)



DETAIL B



DETAIL A

(RAIL NOT SHOWN)

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

SUPERSTRUCTURE DETAILS

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	BUCHANAN COUNTY	PROJECT NUMBER BRC-C010(58)--8E-10	SHEET NUMBER 14

07-MAY-2008 10:10 tsorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 105006 \\ntpprtsvr2\BrgPDF

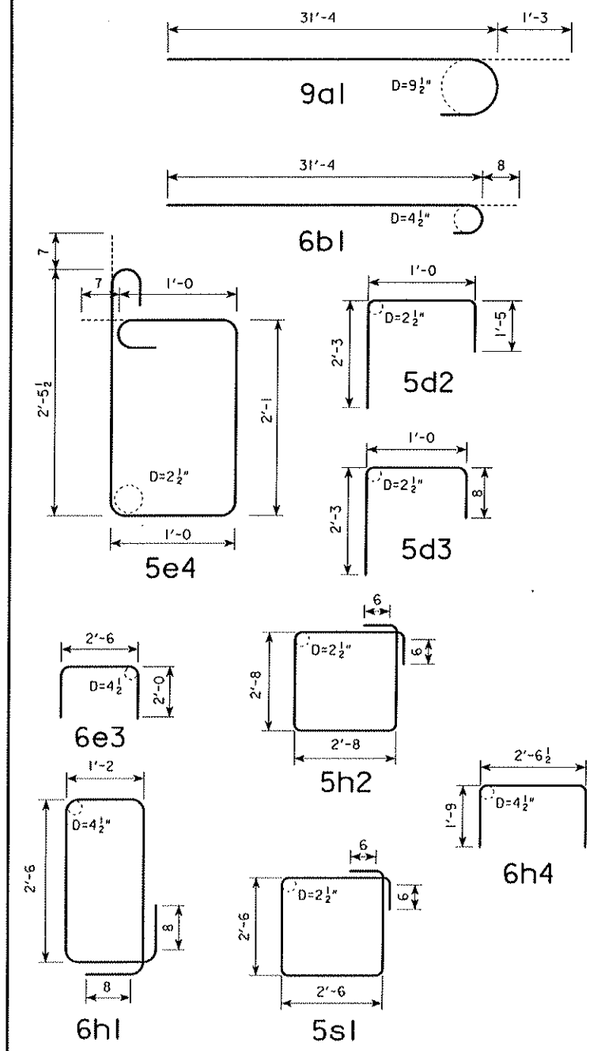
REINFORCING STEEL BAR LIST
(FOR ONE BRIDGE)

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
9a1	SLAB, LONGITUDINAL BOTTOM		102	32'-7	11,300
6b1	SLAB, LONGITUDINAL TOP		54	32'-0	2595
6c1	SLAB, TRANSVERSE BOTTOM		76	24'-8	2816
5d1	SLAB, TRANSVERSE TOP		56	24'-8	1441
8e1	SLAB, TRANSVERSE AT ABUTMENT		16	24'-8	1054
6e3	SLAB, HAIRPINS AT ABUTMENT		56	6'-6	547
5d2	PI BEAM DIAPHRAGM, END HOOP		8	4'-8	39
5d3	PI BEAM DIAPHRAGM, END HOOP		4	3'-11	16
5d4	PI BEAM DIAPHRAGM, FF HORIZ.		4	1'-10	8
5d5	PI BEAM DIAPHRAGM, FF HORIZ.		8	3'-2	26
5d6	PI BEAM DIAPHRAGM, FF HORIZ.		18	3'-9	70
6d7	PI BEAM DIAPHRAGM, BF HORIZ.		8	24'-8	296
5e4	PI BEAM DIAPHRAGM, HOOPS		42	7'-9	339
6h1	PIER CAP, HOOPS		50	8'-8	651
5h2	PIER CAP, HOOPS		40	11'-8	487
8h3	PIER CAP, LONGITUDINAL BOTTOM		20	24'-8	1317
6h4	PIER CAP, ENDS		12	6'-1	110
6h5	PIER CAP, TOP PI BEAM DIAPHRAGM		42	4'-0	252
5m1	ABUTMENT WING, VERTICAL		32	4'-6	150
5n1	ABUTMENT WING, HORIZONTAL		48	6'-8	334
8r1	ABUTMENT FOOTING, HORIZONTAL		14	24'-8	922
5s1	ABUTMENT FOOTING, HOOPS		50	11'-0	574
6t1	ABUTMENT FOOTING TO SLAB DIAPHRAGM DOWELS		112	3'-0	505
8u1	BEAM POCKETS, DOWELS (SEE SHEET 10 FO 16)		64	2'-2	370
	TOTAL WEIGHT - LBS.				26,219

CONCRETE PLACEMENT SUMMARY

CONCRETE		TOTAL
END SPAN + ABUMENT DIAPHRAGM + PIER END DIAPHRAGM	2 AT 48.3	96.6
PI BEAM DIAPHRAGM	2 AT 3.0	6.0
ABUTMENT WINGS	4 AT 1.0	4.0
PIER CAP	2 AT 8.3	16.6
ABUTMENT FOOTING	2 AT 8.3	16.6
TOTAL (CU. YDS.)		139.8

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

SUPERSTRUCTURE DETAILS

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 11 FILE NO. DESIGN NO.

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 15

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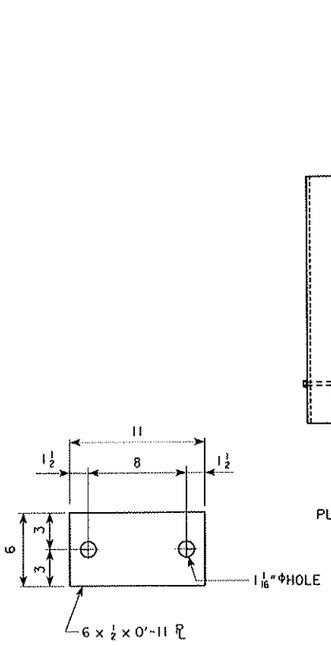
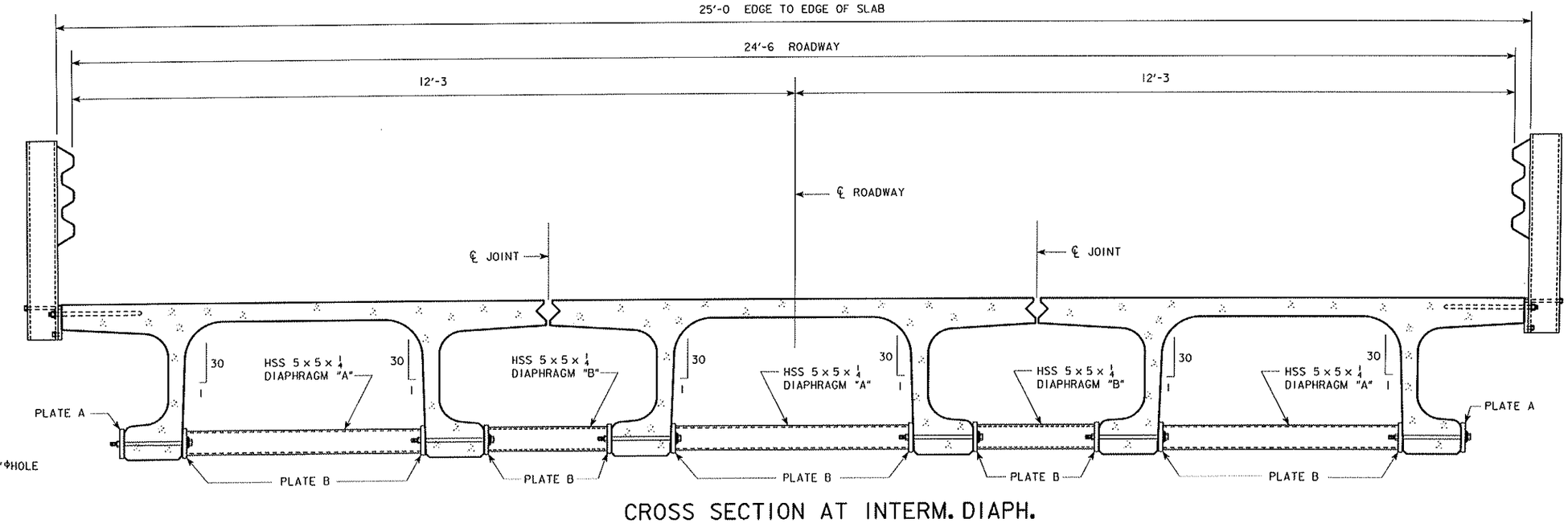


PLATE A

(TYPICAL ALL CONNECTIONS)



CROSS SECTION AT INTERM. DIAPH.

(INTERMEDIATE DIAPHRAGMS LOCATED AT ¼ POINTS)

PI BEAM INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE DIAPHRAGM "A" CONNECTION		NO. OF BEAM CONNECTIONS	WEIGHT
2 - 6 x ½ x 0'-11 ℄	18.7 LBS.	9	168
1 - HSS 5 x 5 x ¼ = 15.62 LBS/FT. DIAPHRAGM A - NOMINAL MEMBER LENGTH = 4'-1⅜(+)		9	578
2 - 6 x ⅛ x 0'-11 ℄ SHIMS	4.7 LBS.	9	42
DIAPHRAGM "A" - TOTAL (LBS.)			788
ONE DIAPHRAGM "B" CONNECTION		**NUMBER OF CONNECTIONS**	
2 - 6 x ½ x 0'-11 ℄	18.7 LBS.	6	112
1 - HSS 5 x 5 x ¼ = 15.62 LBS/FT. DIAPHRAGM B - MEMBER LENGTH = 2'-0⅜		6	190
2 - 6 x ⅛ x 0'-11 ℄ SHIMS	4.7 LBS.	6	28
DIAPHRAGM "B" - TOTAL (LBS.)			330
2 - 6 x ½ x 0'-11 ℄ AT ENDS	18.7 LBS.	3	56
⅞"Φ x 1'-3 H.S. BOLTS WITH NUTS & WASHERS	6.3 LBS.	18	113
INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL - TOTAL (LBS.)			1287

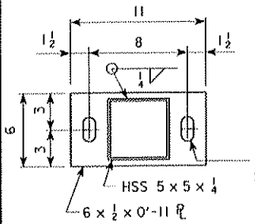
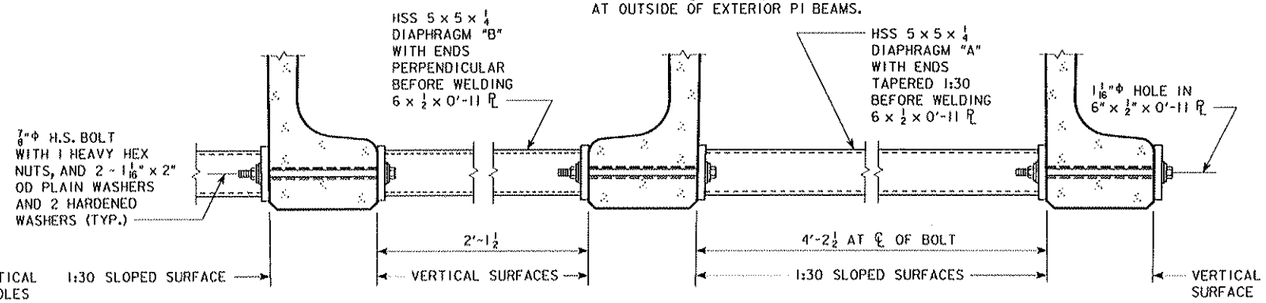


PLATE B

(TYPICAL ALL CONNECTIONS)

NOTE: PROVIDE 2 - 6 x ⅛ x 0'-11 SHIM ℄'s AT EACH 6 x ½ x 0'-11 ℄ LOCATION EXCEPT AT OUTSIDE OF EXTERIOR PI BEAMS.



PART CROSS SECTION SHOWING DIAPHRAGMS & CONNECTIONS

NOTES:

ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS, SHIMS AND WASHERS SHALL BE GALVANIZED.

SHOP DRAWINGS OF THE STEEL DIAPHRAGMS SHOWING LAYOUT AND DETAILS OF THE DIAPHRAGMS SHALL BE SUBMITTED FOR APPROVAL.

ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.

THE 1½"Φ HOLES FOR THE ⅞"Φ H.S. BOLTS HAVE BEEN CAST INTO THE WEB BY OTHERS.

THE ⅞"Φ H.S. BOLTS THROUGH THE WEB SHALL HAVE A THREAD LENGTH OF 3" MIN. AND 4" MAX. AND SHALL MEET THE REQUIREMENTS OF ASTM A449.

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

STEEL INTERM. DIAPH. DETAILS

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 11 FILE NO. DESIGN NO.

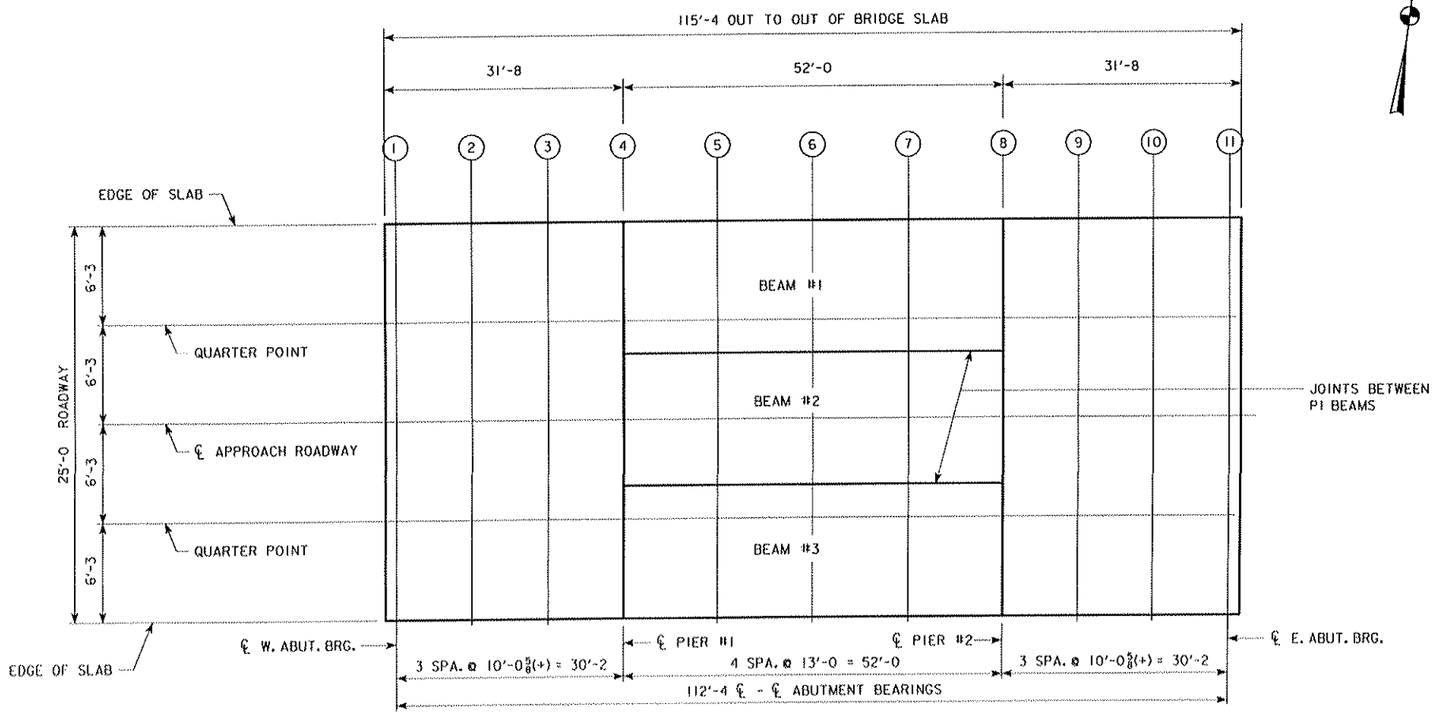
DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 16

07-MAY-2008 10:10 tsorens W:\Projects\BridgesStructures\Research\Buchanan\PI_Bridge.brg 10S008 \\ntpprtsvr2\BrgPDF

TOP OF SLAB ELEVATIONS

LOCATION	℄ W. ABUT. BRG.			℄ PIER #1				℄ PIER #2			℄ E. ABUT. BRG.
	LINE 1	LINE 2	LINE 3	LINE 4	* LINE 5	* LINE 6	* LINE 7	LINE 8	LINE 9	LINE 10	LINE 11
EDGE OF SLAB	1067.68	1067.82	1067.97	1068.11	1068.31	1068.43	1068.48	1068.45	1068.40	1068.35	1068.31
QUARTER POINT	1067.80	1067.90	1068.01	1068.11	1068.31	1068.43	1068.48	1068.45	1068.44	1068.43	1068.43
℄ APPROACH ROADWAY	1067.92	1067.98	1068.05	1068.11	1068.31	1068.43	1068.48	1068.45	1068.48	1068.51	1068.55
QUARTER POINT	1067.80	1067.90	1068.01	1068.11	1068.31	1068.43	1068.48	1068.45	1068.44	1068.43	1068.43
EDGE OF SLAB	1067.68	1067.82	1067.97	1068.11	1068.31	1068.43	1068.48	1068.45	1068.40	1068.35	1068.31

* ELEVATIONS FOR PI BEAM SURFACES ARE BASED ON A 1.4 INCH CAMBER AT LINE 6 OF EACH PI BEAM.



TOP OF SLAB ELEVATION LOCATIONS

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

TOP SLAB ELEVATIONS LAYOUT

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 17

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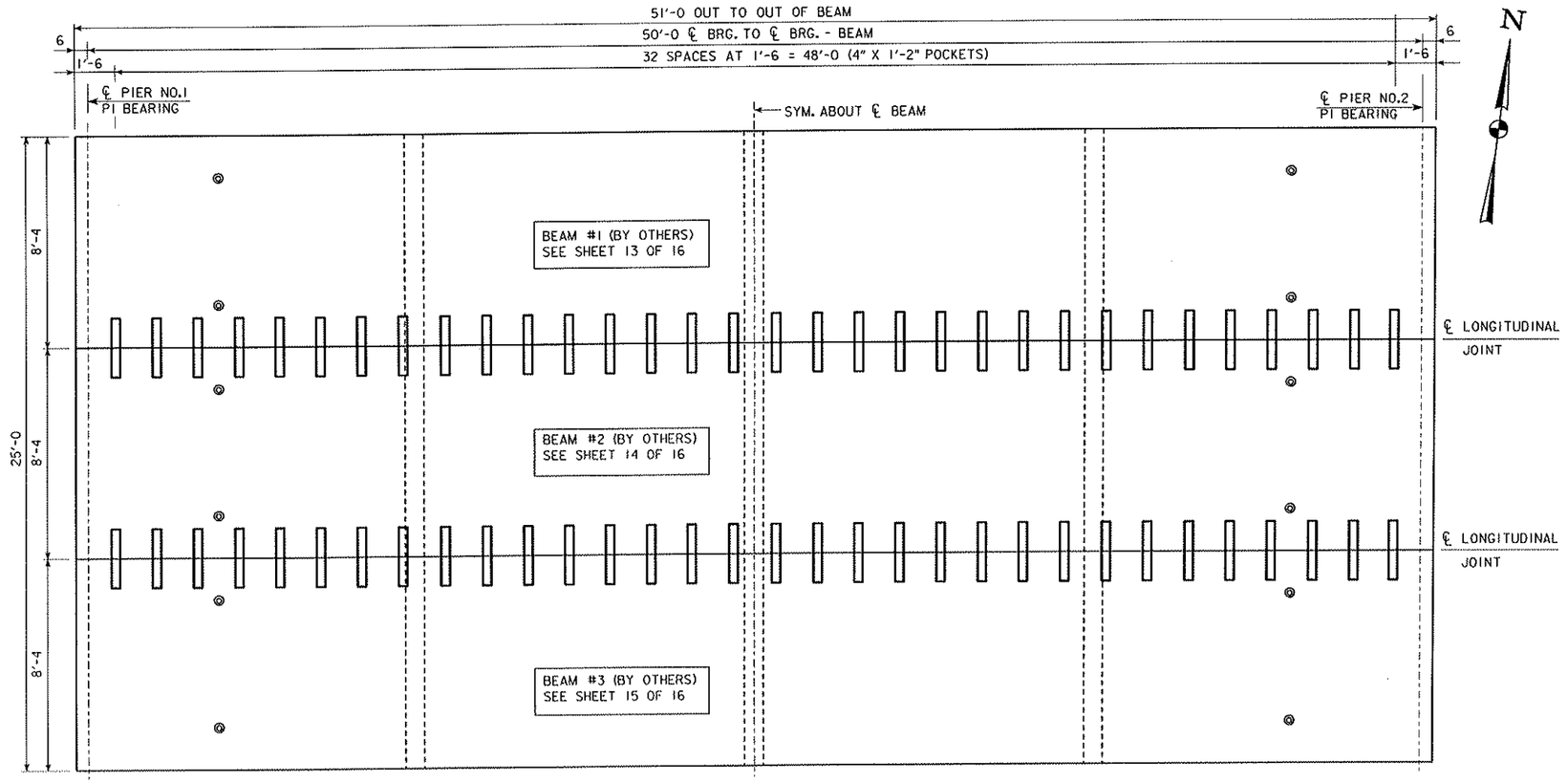
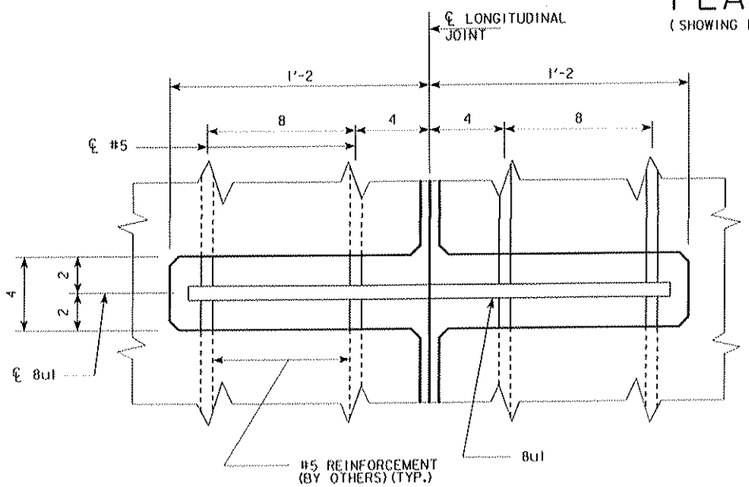
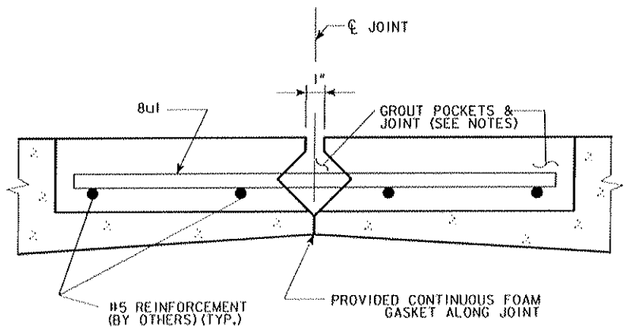


PLAN VIEW
(SHOWING POCKET LOCATIONS)



PLAN VIEW SHOWING JOINT TIE



TYPICAL LONGITUDINAL SECTION THRU JOINT DETAIL

GROUT FOR POCKETS:

THE GROUT MATERIAL PLACED AROUND THE BARS SHALL BE ONE OF THE MATERIALS LISTED IN THE APPROVED PRODUCTS LIST BELOW, OR EQUAL APPROVED BY THE ENGINEER.

CONSPEC MARKETING & MFG. PAVE PATCH 3000
DEGUSSA BUILDING SYSTEMS THOROC 10-60 REPAIR MORTAR SET 45
FIVE STAR PRODUCTS, INC. HIGHWAY PATCH
L & M CONSTRUCTION CHEMICALS DURAPATCH HIWAY
UNIVERSAL FORM CLAMP COMPANY UNI ROAD REPAIR DOT

THE GROUT SHALL BE EXTENDED AS PER THE MANUFACTURER RECOMMENDS. THE AGGREGATE FOR EXTENDING THE GROUT SHALL BE PEA GRAVEL WITH A MINIMUM DURABILITY OF CLASS 2 APPROVED BY THE ENGINEER AND MEETING THE FOLLOWING GRADATION.

SIEVE SIZE PERCENTAGE
PASSING $\frac{1}{2}$IN. 100; $\frac{3}{8}$IN. 85-100; NO. 8 0-8

IF NOT FROM THE APPROVED LIST ABOVE, AN ASTM C 928 SHRINKAGE COMPENSATED GROUT, WITH MAXIMUM AGGREGATE EXTENSION, SHALL MEET THE FOLLOWING STRENGTH REQUIREMENTS:

4-HR. MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI, ASTM-C39
24-HR. MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI, ASTM-C39
24 HR. BOND TO DRY PCC, 1000 PSI, ASTM-C882

THE CONTRACTOR SHALL FURNISH A LIST OF MATERIALS FOR USE IN MAKING THE GROUT, AND THE MIX DESIGN, TO THE ENGINEER 30 CALENDAR DAYS PRIOR TO INSTALLATION. TESTING OF THE GROUT BY THE ENGINEER MAY BE DONE ANYTIME DURING GROUT PRODUCTION.

THE INSIDE OF ALL 4 IN X 12 IN SLOTS SHALL BE ROUGHED TO PROVIDE BOND FOR THE GROUT. THE SLOTS SHALL BE FULL DEPTH AS SHOWN IN THE PLANS.

THE GROUT SHALL BE PRODUCED WITH A PORTABLE MIXER APPROVED BY THE ENGINEER. ALL GROUT SHALL BE PLACED IMMEDIATELY AFTER MIXING AND BEFORE THE GROUT HAS ATTAINED INITIAL SET. THE GROUT SHALL NOT BE RE-TEMPERED WITH WATER. THE CONTRACTOR SHALL THOROUGHLY MOISTEN ALL SURFACES OF THE POCKETS IMMEDIATELY PRIOR TO FILLING WITH GROUT. ALL EXCESS WATER SHALL BE REMOVED WITH COMPRESSED AIR.

IMMEDIATELY AFTER PLACEMENT, GROUT SHALL BE THOROUGHLY COATED WITH WHITE PIGMENTED CURING COMPOUND.

GROUT SHALL BE PLACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. GROUT SHALL BE THOROUGHLY CONSOLIDATED WITH A HAND HELD VIBRATOR SO THE GROUT COMPLETELY SURROUNDS DOWEL BARS. GROUT SHALL BE PLACED SO THAT THE MATERIAL IS AT LEAST $\frac{1}{8}$INCH HIGHER THAN THE PAVEMENT IF THE PAVEMENT IS TO BE DIAMOND GROUND. IF THE PAVEMENT IS NOT TO BE GROUND, THE GROUT SHALL BE FINISHED FLUSH WITH THE SURFACE.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A PROCESS CONTROL PLAN ONE WEEK PRIOR TO THE BEGINNING OF ANY RETROFIT WORK. THIS PLAN SHALL INCLUDE THE MIX DESIGN AND PROPORTION CONTROL FOR THE GROUT MIXTURE FOR THE POCKETS.

COST OF FIELD GROUTING OF THE POCKETS SHALL BE INCLUDED IN THE COST OF 'BEAMS PRETENSIONED PRESTRESSED CONCRETE, ERECT AS PER PLAN' AND NO SEPARATE PAYMENT WILL BE MADE.

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)

52'-0 INTERIOR SPAN (PI BEAM)

POCKET LAYOUT

STA. 50+00

MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	BUCHANAN COUNTY	PROJECT NUMBER BRC-C010(58)--8E-10	SHEET NUMBER 18

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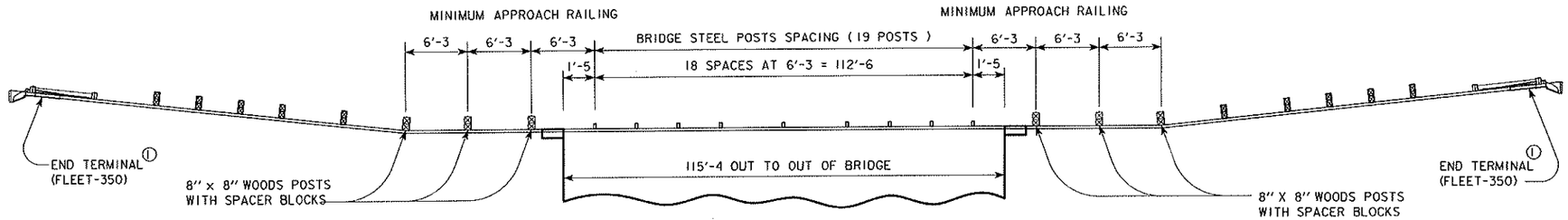
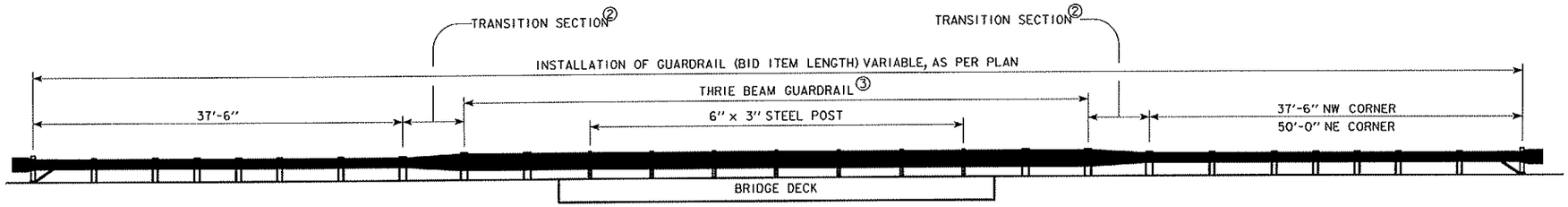
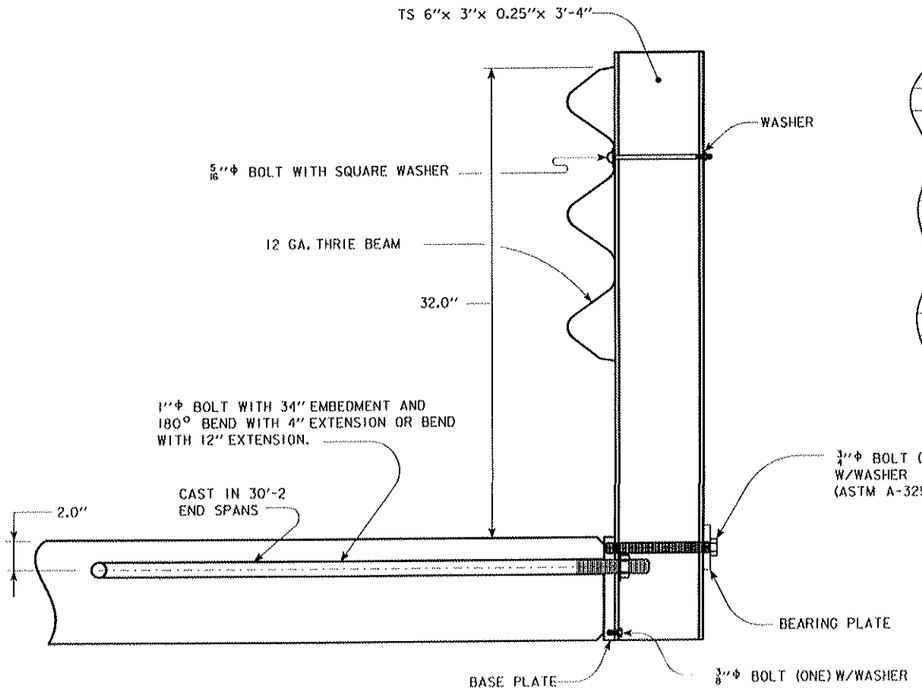


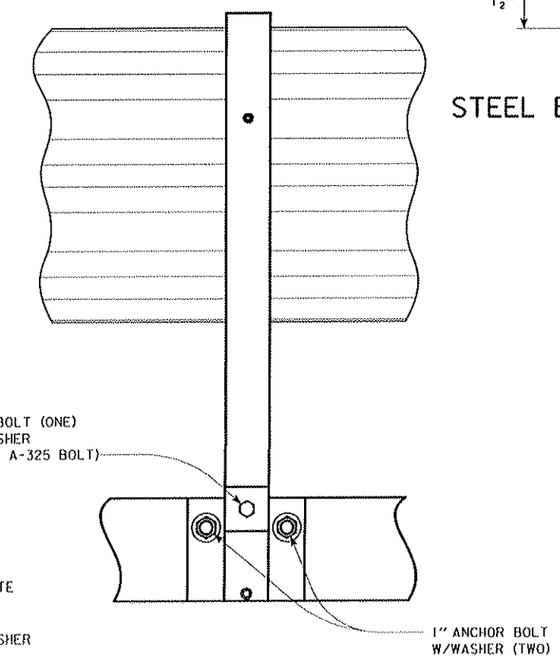
PLAN VIEW



TYPICAL SECTION AT BRIDGE

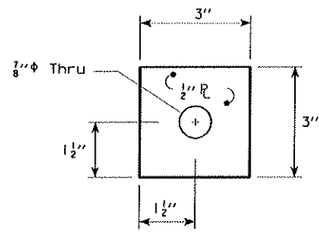


END VIEW

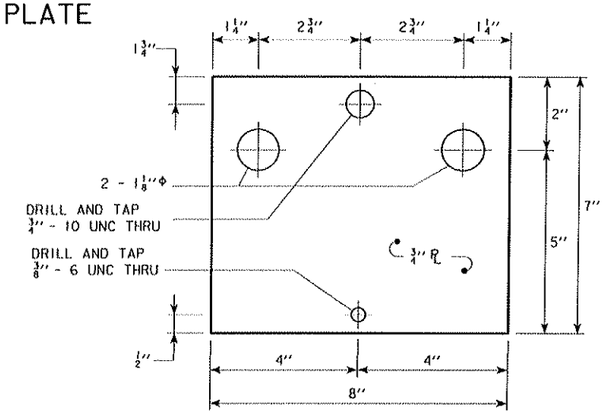


SIDE VIEW

TYPICAL BRIDGE RAILING



STEEL BEARING PLATE



STEEL BASE PLATE

GENERAL NOTES:

THIS DETAIL SHEET SHOWS THE CONSTRUCTION DETAILS FOR SERVICE LEVEL I BRIDGE RAIL AND THE CONNECTING STEEL BEAM GUARDRAIL FOR USE ON THE SECONDARY ROAD SYSTEM.

UNLESS OTHERWISE NOTED BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS TO THE REQUIREMENTS OF ASTM A563 GRADE A OR BETTER. OTHER BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 AND NUTS TO REQUIREMENTS OF ASTM A563 GRADE C OR BETTER ALL NUTS, BOLTS AND WASHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.

DECK ANCHORAGE OF THE POST ASSEMBLY SHALL BE PROVIDED BY APPLYING A 10 kip (45-kn) FORCE TO THE POST AT 22 INCHES ABOVE THE DECK AND DESIGNED ACCORDING TO THE LATEST AASHTO BRIDGE SPECIFICATIONS.

STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM 36, OR EQUIVALENT, AND BE GALVANIZED ACCORDING TO ASTM A123. POST ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM GRADE B, OR ASTM 501, AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

GUARDRAIL SHALL BE LAPPED TOWARDS THE OBSTACLE.

PRICE BID FOR CONTRACT ITEMS SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND CONSTRUCTING GUARDRAIL ESSENTIALLY AS INDICATED HEREON.
CONTRACT ITEMS FOR GUARDRAIL CONSTRUCTION ARE:

INSTALLATION OF GUARDRAIL IN LINEAR FEET
BEAM GUARDRAIL TERMINAL (RE-76)

① SEE STANDARD ROAD PLAN RE-76
② SEE STANDARD ROAD PLAN RE-2B
③ SEE STANDARD ROAD PLAN RE-12B

DESIGN FOR 0° SKEW

112'-4 x 24'-6 CONCRETE BRIDGE

30'-2 END SPANS (CONCRETE SLAB)
52'-0 INTERIOR SPAN (PI BEAM)

SERVICE LEVEL I BRIDGE RAIL DETAILS

STA. 50+00
MARCH, 2008

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 11 OF 11 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	BUCHANAN COUNTY	PROJECT NUMBER BRC-C010(58)--8E-10	SHEET NUMBER 19

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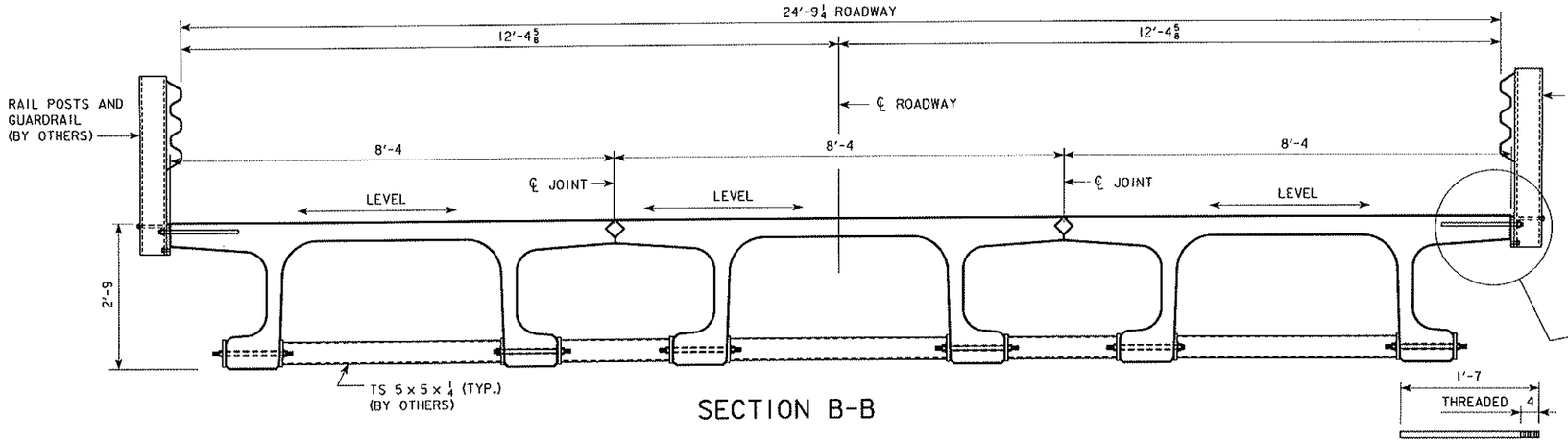
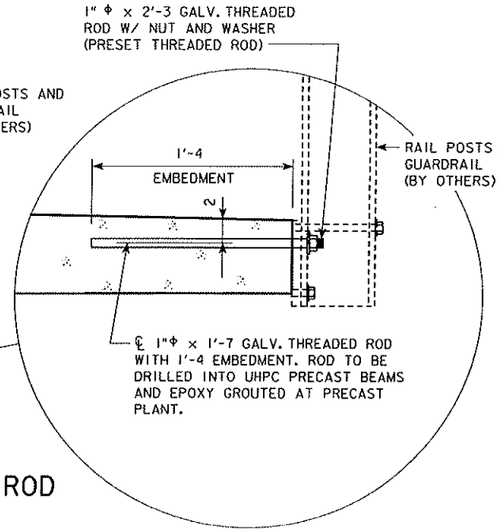
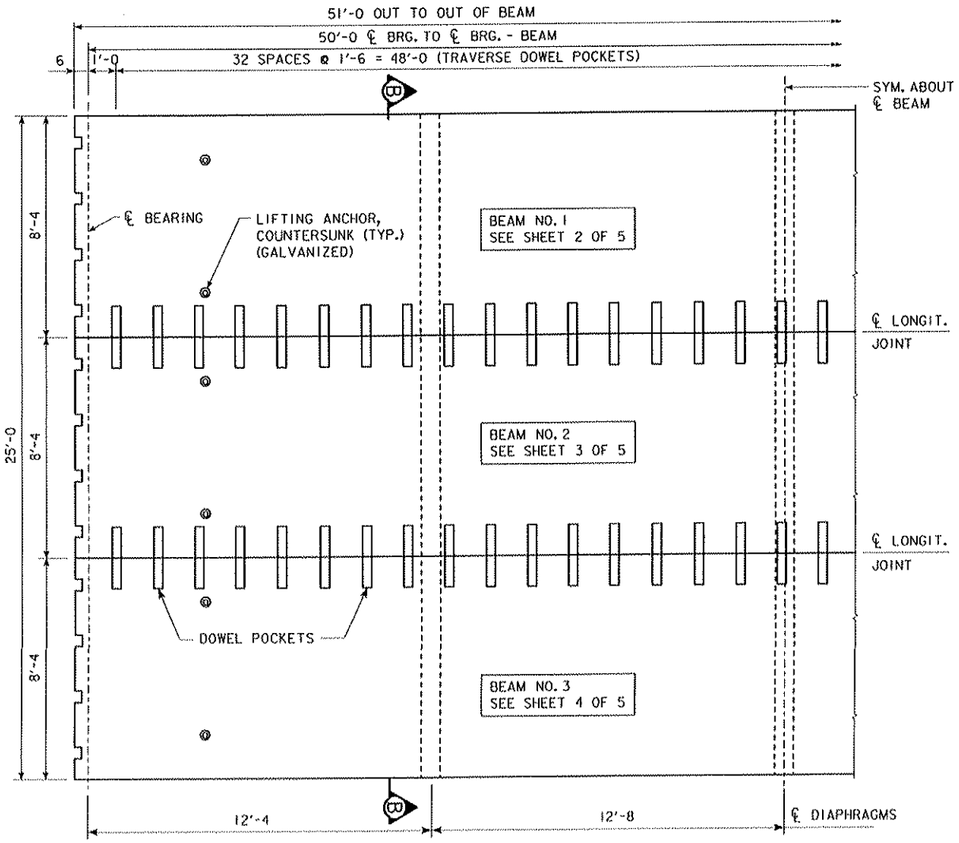


SECTION B-B



1"Φ x 1'-7 GALV. THREADED ROD

(DRILLED IN EPOXY GROUTED ANCHOR)



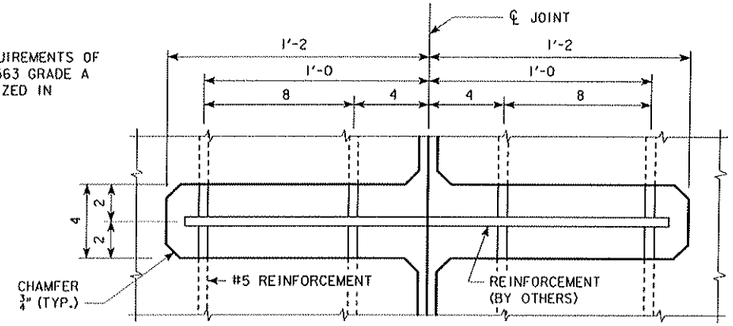
PARTIAL PLAN VIEW

(3 ASSEMBLED BEAMS)

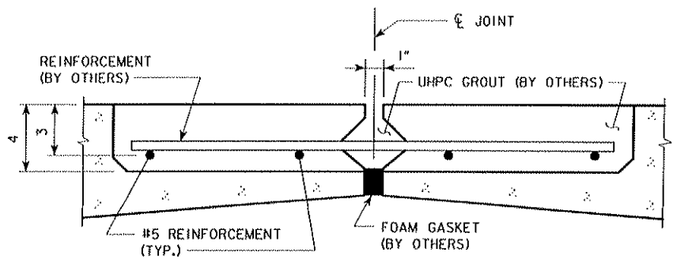
ANCHOR ROD NOTES:

THE 1"Φ x 1'-7 ANCHOR RODS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS TO THE REQUIREMENTS OF ASTM A563 GRADE A OR BETTER. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.

THIS SHEET IS INCLUDED FOR INFORMATION ONLY.



PLAN VIEW SHOWING DOWEL POCKETS



TYPICAL LONGITUDINAL SECTION THRU JOINT DETAIL AT POCKET LOCATIONS

STRUCTURAL DESIGN

LICENSED PROFESSIONAL ENGINEER
Dean G. Bierwagen
11306
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature — Date 2/14/08

Dean G. Bierwagen
Printed or Typed Name

My license renewal date is December 31, 2008

Pages or sheets covered by this seal: 1 THROUGH 5 OF 5

DESIGN FOR PRESTRESSED UHPC PRECAST BEAMS FOR A

112'-4 x 24'-6 UHPC BEAMS

30'-2 END SPANS (CAST-IN-PLACE) 52'-0 INTERIOR SPAN (PRECAST)

DETAIL CROSS SECTION

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM - DGB | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 20

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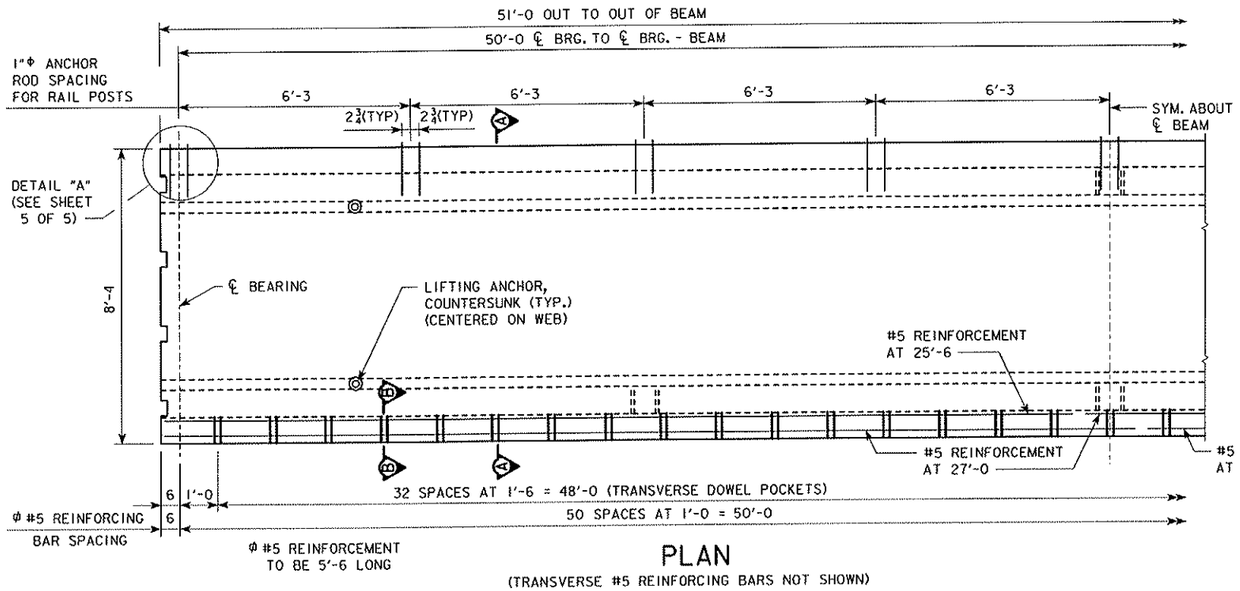
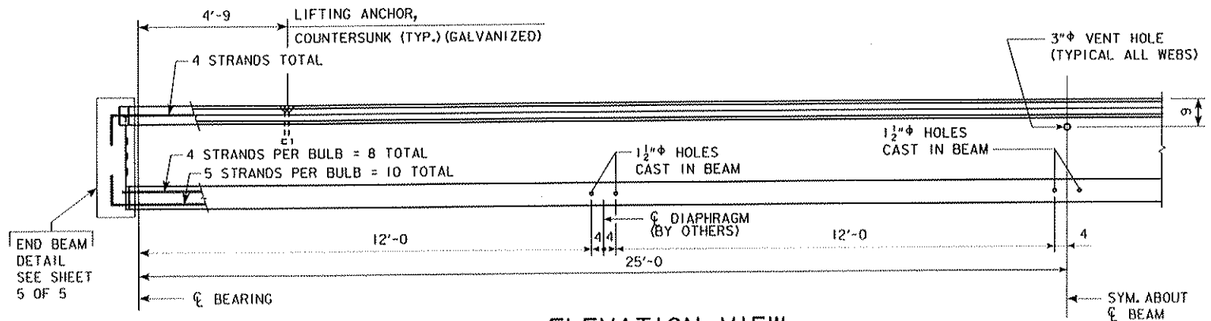
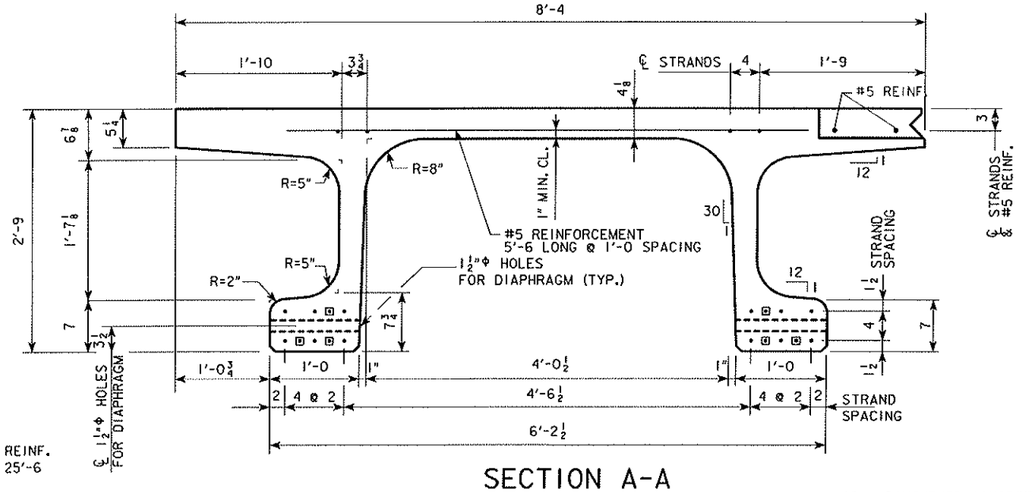


PLAN

(TRANSVERSE #5 REINFORCING BARS NOT SHOWN)



ELEVATION VIEW

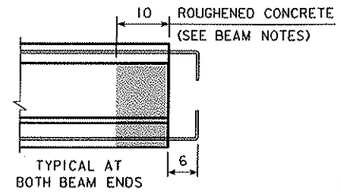


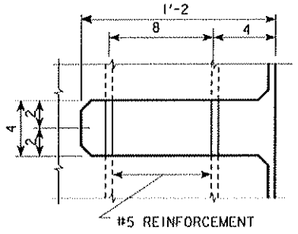
SECTION A-A

BOTTOM STRAND DEBONDING	
SYMBOL	DEBONDED LENGTH FROM EACH END OF BEAM
⊡	3'-0

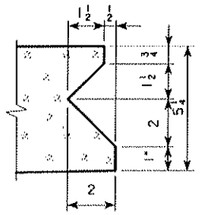
A = 860.8 in²
yb = 22.5 in
I = 105,730 in⁴
wt/ft = 0.932 k/ft

SECTION PROPERTIES

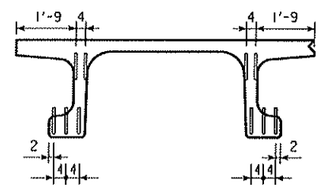




VIEW C-C

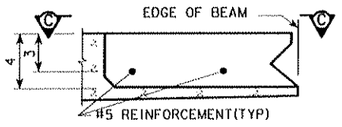


TYPICAL KEYWAY SECTION



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

THE TOP SLAB STRANDS AND BOTTOM SIX STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS AND ARE TO BE SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS ARE TO BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



SECTION B-B

PI BEAM DATA

PI BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH f'ci (ksi)	CONCRETE STRENGTH f'c (ksi)	STRAND SIZE DIA. (in)	NO. OF STRAND STRAIGHT	NO. OF STRAND DEFLECTED	TOTAL INITIAL PRESTRESS ① kips		CAMBER (in) AT RELEASE	CAMBER (in) AFTER LOSSES	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (LBS.)
PI 50	50'-0	51'-0	12.5	21.50	0.60	22	0	936		0.75	1.40	23.8	11.3	420

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5 AND PLAN SPECIAL PROVISIONS.
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 270.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: AASHTO LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS AND HL93 LOADING.

BEAM NOTES:

ALL PRESTRESSING STRANDS SHALL BE 0.60 in. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 in²) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 kips.

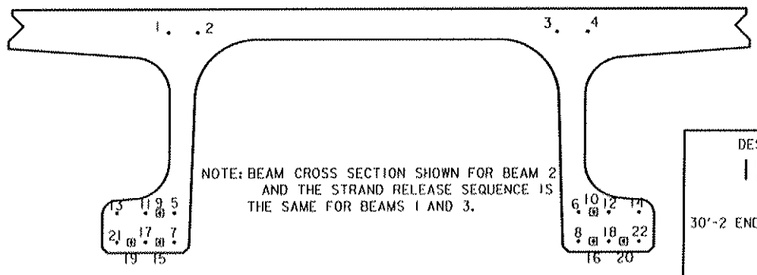
① TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's = 270 ksi.

ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAM DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED.

THE PORTION OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10 INCHES FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE IOWA SPECIFICATIONS.

REINFORCEMENT TO CONFORM TO ARTICLE 4151.03 OF THE IOWA SPECIFICATIONS.



NOTE: BEAM CROSS SECTION SHOWN FOR BEAM 2 AND THE STRAND RELEASE SEQUENCE IS THE SAME FOR BEAMS 1 AND 3.

STRAND RELEASE SEQUENCE

THIS SHEET IS INCLUDED FOR INFORMATION ONLY.

DESIGN FOR PRESTRESSED UHPC PRECAST BEAMS FOR A

112'-4 x 24'-6 UHPC BEAMS

30'-2 END SPANS (CAST-IN-PLACE) 52'-0 INTERIOR SPAN (PRECAST)

BEAM NO. 1 DETAILS

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM - DGB | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 21

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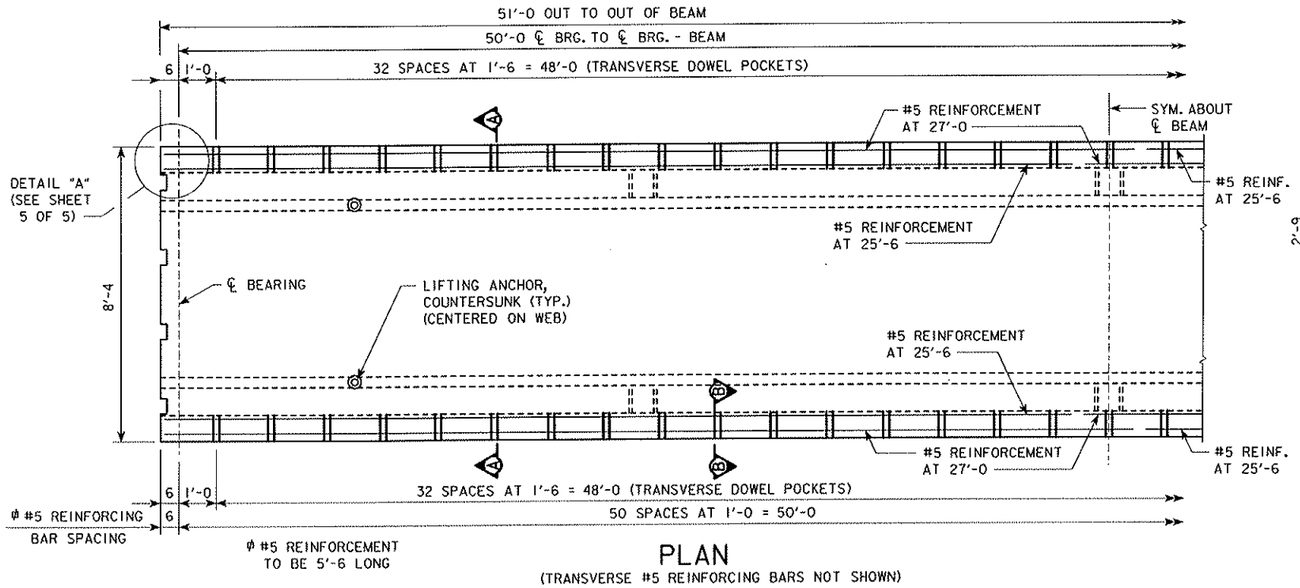
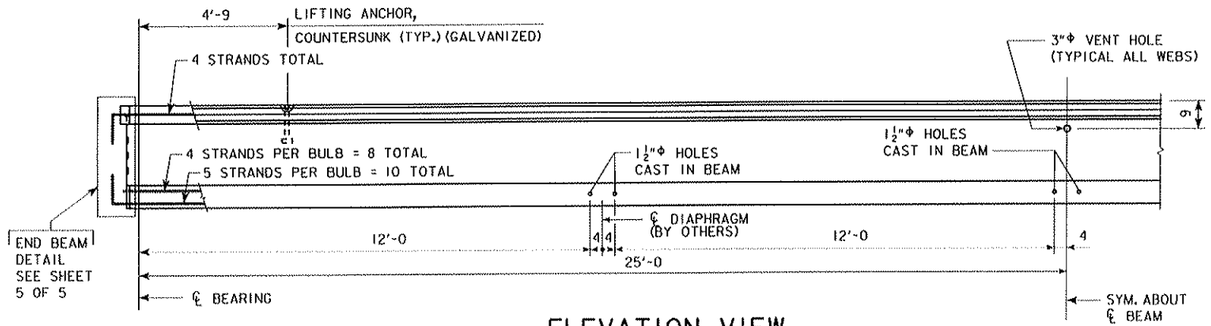


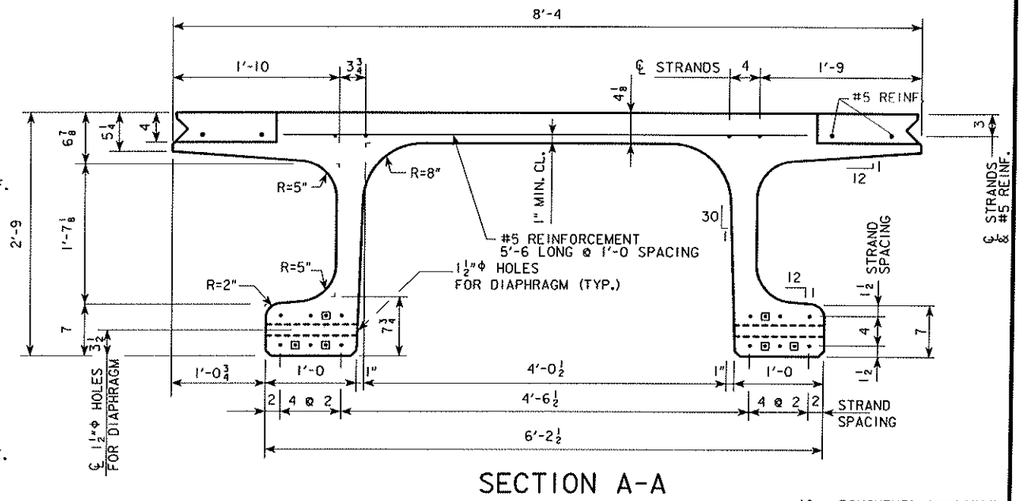
PLAN

(TRANSVERSE #5 REINFORCING BARS NOT SHOWN)



ELEVATION VIEW

(TRANSVERSE #5 REINFORCING BARS NOT SHOWN)



SECTION A-A

BOTTOM STRAND DEBONDING	
SYMBOL	DEBONDED LENGTH FROM EACH END OF BEAM
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A = 860.8 in²
yb = 22.5 in
I = 105,730 in⁴
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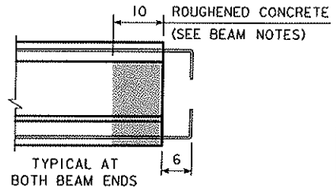
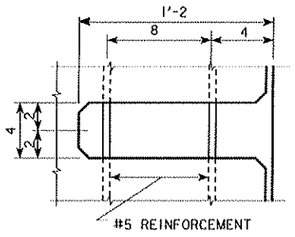
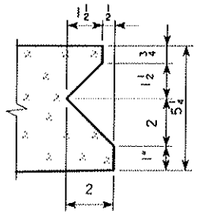
SECTION PROPERTIES

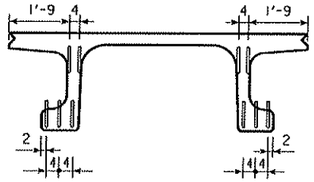




VIEW C-C

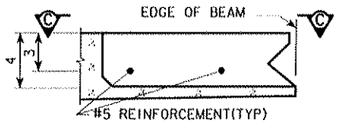


TYPICAL KEYWAY SECTION



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

THE TOP SLAB STRANDS AND BOTTOM SIX STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS AND ARE TO BE SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS ARE TO BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



SECTION B-B

PI BEAM DATA

PI BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH f'ci (ksi)	CONCRETE STRENGTH f'c (ksi)	STRAND SIZE DIA. (in)	NO. OF STRAND STRAIGHT	NO. OF STRAND DEFLECTED	TOTAL INITIAL PRESTRESS ① Kips	CAMBER (in) AT RELEASE	CAMBER (in) AFTER LOSSES	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (LBS.)
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DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5 AND PLAN SPECIAL PROVISIONS.
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 270.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: AASHTO LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS AND HL93 LOADING.

BEAM NOTES:

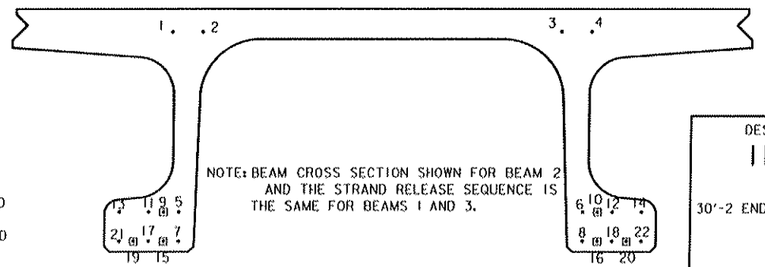
ALL PRESTRESSING STRANDS SHALL BE 0.60 in. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 in²) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 kips.

① TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's. = 270 ksi. ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAM DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED.

THE PORTION OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE PIER DIAPHRRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10 INCHES FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE IOWA SPECIFICATIONS.

REINFORCEMENT TO CONFORM TO ARTICLE 4151.03 OF THE IOWA SPECIFICATIONS.



NOTE: BEAM CROSS SECTION SHOWN FOR BEAM 2 AND THE STRAND RELEASE SEQUENCE IS THE SAME FOR BEAMS 1 AND 3.

STRAND RELEASE SEQUENCE

THIS SHEET IS INCLUDED FOR INFORMATION ONLY.

DESIGN FOR PRESTRESSED UHPC PRECAST BEAMS FOR A

112'-4 x 24'-6 UHPC BEAMS

30'-2 END SPANS (CAST-IN-PLACE) 52'-0 INTERIOR SPAN (PRECAST)

BEAM NO. 2 DETAILS

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM - DGB | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 22

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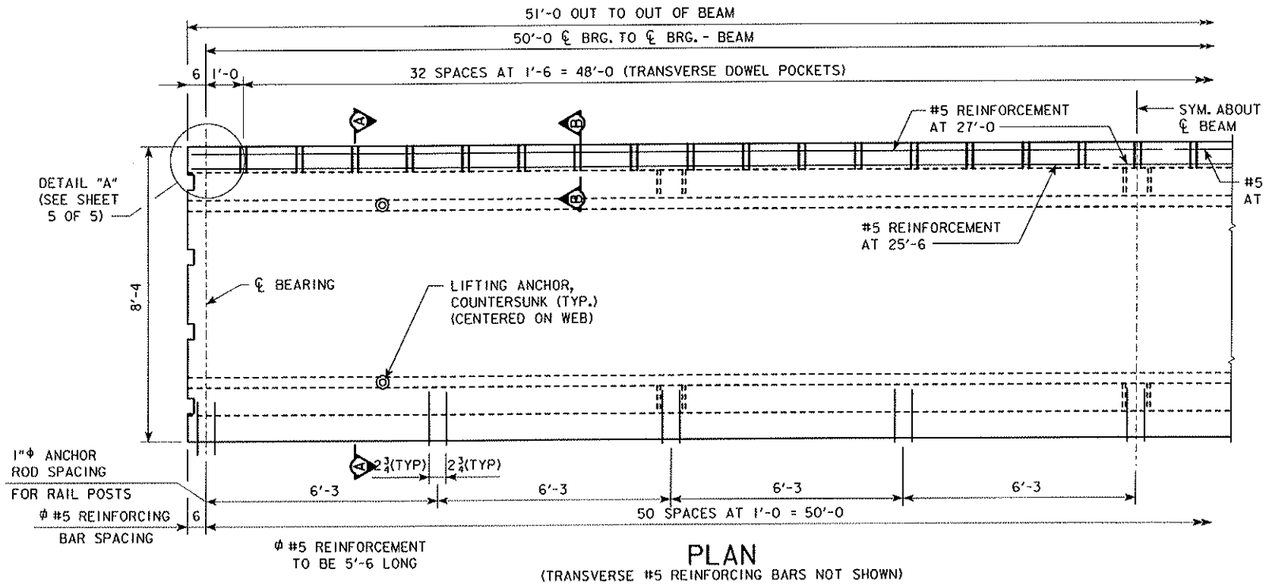
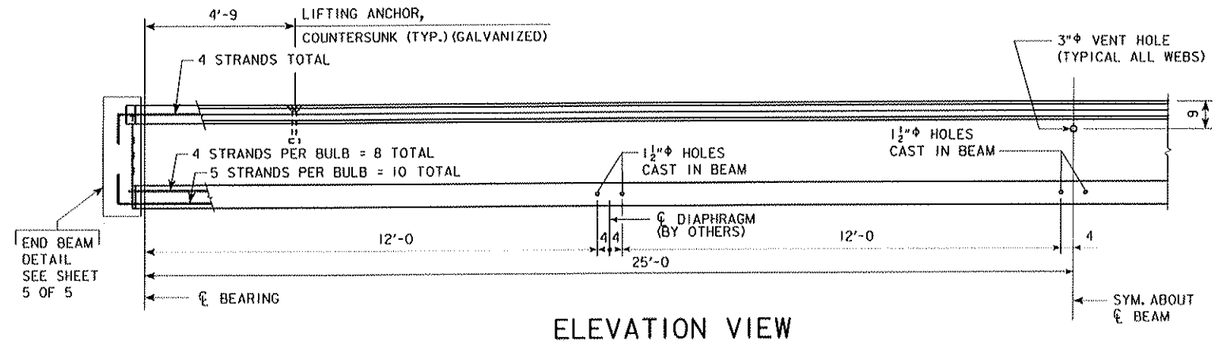
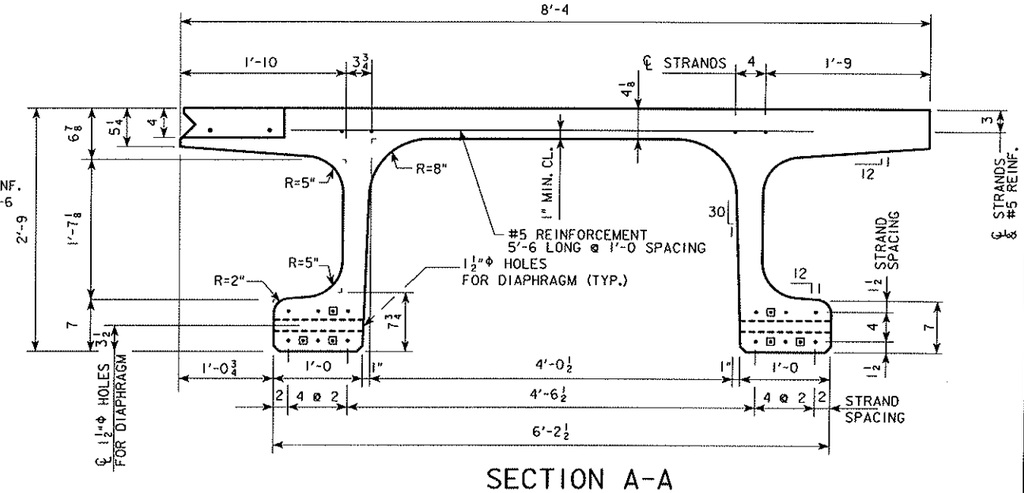


PLAN

(TRANSVERSE #5 REINFORCING BARS NOT SHOWN)



ELEVATION VIEW

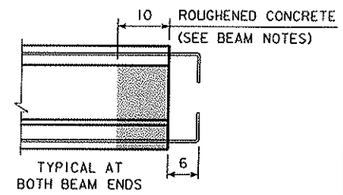


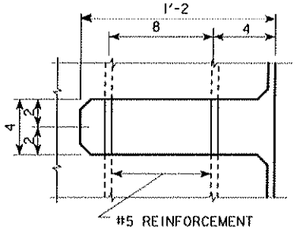
SECTION A-A

BOTTOM STRAND DEBONDING	
SYMBOL	DEBONDED LENGTH FROM EACH END OF BEAM
⊡	3'-0

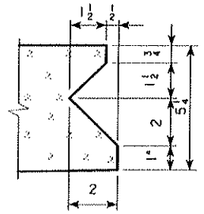
A = 860.8 in²
yb = 22.5 in
I = 105,730 in⁴
wt/ft = 0.932 k/ft

SECTION PROPERTIES

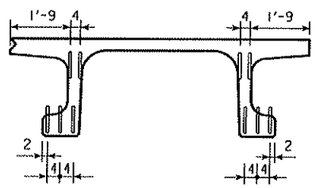




VIEW C-C

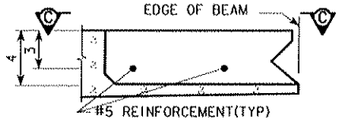


TYPICAL KEYWAY SECTION



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

THE TOP SLAB STRANDS AND BOTTOM SIX STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS AND ARE TO BE SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS ARE TO BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



SECTION B-B

PI BEAM DATA

PI BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH f'ci (ksi)	CONCRETE STRENGTH f'c (ksi)	STRAND SIZE DIA. (in)	NO. OF STRAND STRAIGHT	NO. OF STRAND DEFLECTED	TOTAL INITIAL PRESTRESS ① kips	CAMBER (In) AT RELEASE	CAMBER (In) AFTER LOSSES	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (LBS.)
PI 50	50'-0	51'-0	12.5	21.50	0.60	22	0	936	0.75	1.40	23.8	11.3	420

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5 AND PLAN SPECIAL PROVISIONS.
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 270.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: AASHTO LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS AND HL93 LOADING.

BEAM NOTES:

ALL PRESTRESSING STRANDS SHALL BE 0.60 In. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 In²) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 kips.
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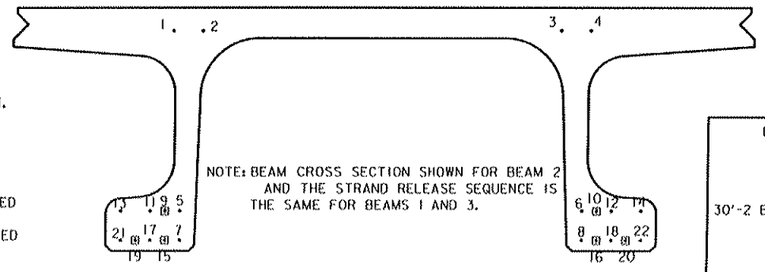

STRAND RELEASE SEQUENCE

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DESIGN FOR PRESTRESSED UHPC PRECAST BEAMS FOR A
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BEAM NO. 3 DETAILS
BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 4 OF 5 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM - DGB | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 23

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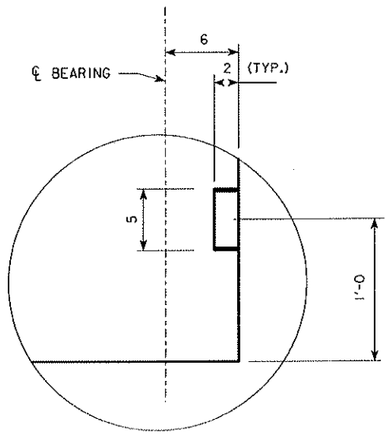
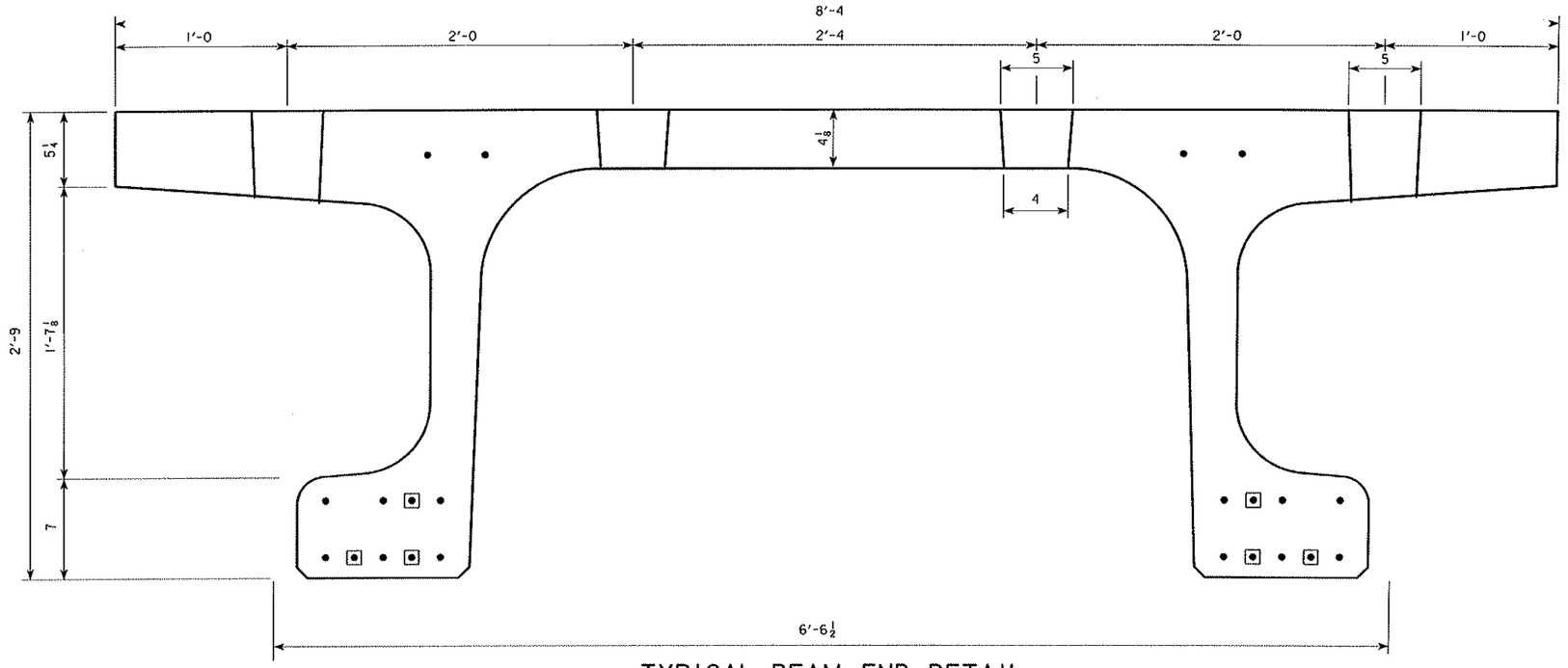


DETAIL "A"



TYPICAL BEAM END DETAIL

(STRAND BENDS NOT SHOWN)

● = BOTTOM STRAND DEBONDING

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DESIGN FOR PRESTRESSED UHPC PRECAST BEAMS FOR A

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END OF BEAM DETAILS

BUCHANAN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM - DOB | BUCHANAN COUNTY | PROJECT NUMBER BRC-C010(58)--8E-10 | SHEET NUMBER 24

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