

BRIDGE REPLACEMENT - OTHER  
IBRC-C061(76)--8E-61

MADISON COUNTY

MADISON COUNTY - DESIGN NO. 106

CONVENTIONAL SIGNS	
	DIVIDED HIGHWAY
	PAVED ROAD
	BITUMINOUS ROAD
	GRAVEL ROAD
	EARTH ROAD
	INTERSTATE HIGHWAY
	UNITED STATES HIGHWAY
	STATE HIGHWAY
	COUNTY HIGHWAY
	RAILROAD
	PIPELINE
	AIRPORT
	HYDROLOGY
	BRIDGE
	STATE BOUNDARY
	COUNTY BOUNDARY
	CORPORATE LIMIT LINE
	TOWNSHIP LINE
	SECTION LINE



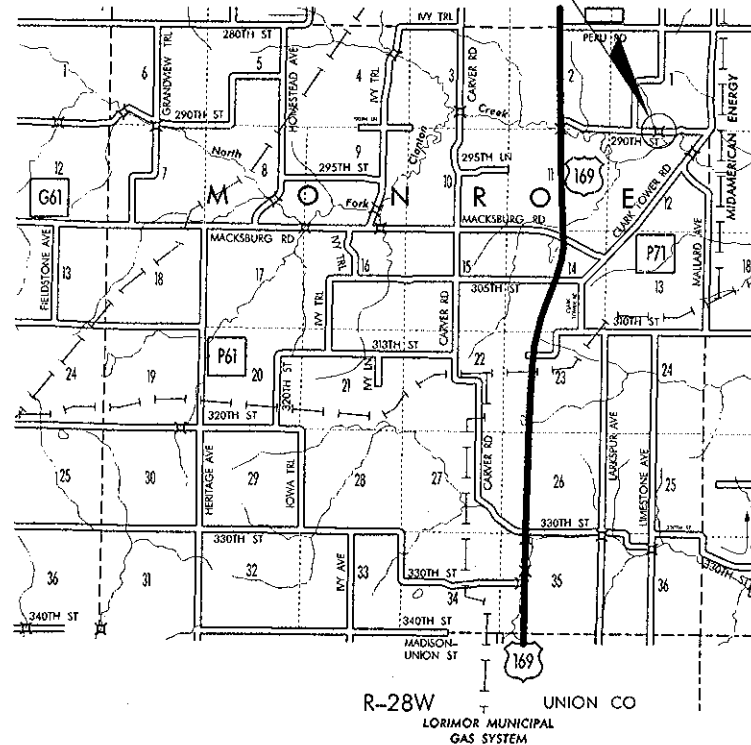
Iowa Department of Transportation  
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE  
**SECONDARY ROAD SYSTEM**  
MADISON COUNTY  
BRIDGE REPLACEMENT - OTHER  
**290th STREET**  
**OVER BRANCH CLANTON CREEK**

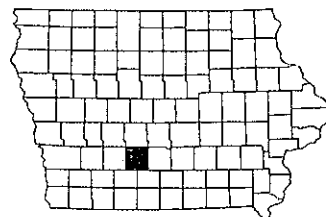
THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2001, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

VALUE ENGINEERING SAVES. REFER TO THE GENERAL NOTES IN THESE PLANS.

DESIGN NO. 106



LOCATION MAP



ALL WORKING DRAWINGS INCLUDING  
SHOP DRAWINGS AND FALSEWORK DRAWINGS  
WILL BE CHECKED BY:  
  
IOWA DOT OFFICE OF BRIDGES AND STRUCTURES  
800 LINCOLNWAY  
AMES, IA 50010  
515-239-1206

STANDARD ROAD  
PLANS

STANDARD ROAD PLANS ARE LISTED  
ON SHEET

DESIGN DATA RURAL

2004 AADT 10 V.P.D.

REVISIONS

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	RONALD J. MEYER	STRUCTURAL
12	TODD HAGAN	ROADWAY

STRUCTURAL DESIGN



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.

*Ronald J. Meyer*  
Signature  
Printed or Typed Name  
Date

My license renewal date is December 31, 2007

Pages or sheets covered by this seal: SHEETS 1 THRU 11 & 13 OF 13

PROJECT DIRECTORY NAME: w:\Projects\BridgesStructures\LocalSystem\_PrimaryRoutes\MadisonCounty\BRFinal\

DESIGN TEAM RJM/GJK/MSF/AJS

ENGLISH

IOWA DOT \* OFFICE OF BRIDGES AND STRUCTURES

FILE NO. 30139

MADISON COUNTY

PROJECT NUMBER IBRC-C061(76)--8E-61

SHEET NUMBER 1

W:\Projects\BridgesStructures\LocalSystem\_PrimaryRoutes\MadisonCounty\BRFinal\Ibrc61.BRIDGE.BRG 610106s000

ESTIMATED BRIDGE QUANTITIES BOTH BRIDGES					
ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT	TOTAL	AS BUILT QUANTITY
1	2102-2710070	EXCAVATION, CL 10, RDWY+BORROW	CY	264	
2	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1	
3	2402-2720000	EXCAVATION, CL 20	CY	66.2	
4	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	6.4	
5	2404-7775000	REINFORCING STEEL	LB	725	
6	2417-1040018	CULV, CMP ENT, 18"	LF	34	
7	2501-5425042	PILE, DRIVE STEEL BEAR, HP10x42	LF	350	
8	2501-5550042	PILE, FURN STEEL BEAR, HP10x42	LF	350	
9	2505-4008200	INSTALL OF G'RAIL	LF	225	
10	2505-4021762	G'RAIL TERMINAL, BEAM, FLARED, RE-76	EACH	4	
11	2506-4984000	FLOWABLE MORTAR	CY	5.0	
12	2507-3250005	ENGINEER FABRIC	SY	136	
13	2507-6800042	REVETMENT, CLASS D	TON	174	
14	2518-6910000	SAFETY CLOSURE	EACH	4	
15	2528-8445110	TRAFFIC CONTROL	LS	1	
16	2533-4980005	MOBILIZATION	LS	1	
17	2599-9999005	PRETENSIONED PRECAST 48" X 27" DECK PANEL	EACH	6	
18	2599-9999005	PRECAST ABUTMENT	EACH	2	

ITEM NO.	ESTIMATE REFERENCE INFORMATION
3	INCLUDES FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL AND SUBDRAIN OUTLETS AT ABUTMENTS. INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
10	INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING AND PLACING THE PRETENSIONED PRECAST DECK PANELS. INCLUDES ABUTMENT BEARING MATERIAL AND MATERIAL NEEDED FOR TRANSVERSE ASSEMBLY. INCLUDES 1.0 C.Y. OF GROUT FOR SHEAR KEYS BETWEEN PANELS. GRADATION OF COARSE AGGREGATES FOR PRESTRESSED CONCRETE BRIDGE UNITS SHALL MEET THE REQUIREMENTS OF SECTION 4115 CLASS 3 DURABILITY. GRADATION OF THE COARSE AGGREGATE SHALL MEET THE REQUIREMENTS OF SECTION 2407.02A.
11	THIS ITEM INCLUDES ALL COSTS FOR FURNISHING AND PLACING THE PRECAST ABUTMENT FOOTING INCLUDING (ONE ABUTMENT) 9.4 C.Y. OF STRUCTURAL CONCRETE (BRIDGE), 1267 LBS. REINFORCING STEEL, MECHANICAL SPLICERS, 18.0 L.F. OF 21" CMP, AND 1.6 C.Y. OF STRUCTURAL CONCRETE (MISC.) TO BACKFILL THE PILE VOID. INCLUDES COST OF TEMPORARILY BLOCKING THE ABUTMENT FOOTING UNTIL THE CONCRETE BACKFILL IN THE PILE VOID HAS OBTAINED THE REQUIRED STRENGTH. THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT WILL BE FOR EACH PRECAST ABUTMENT FOOTING FURNISHED AND PLACED.

## SPECIFICATIONS:

DESIGN: AASHTO SERIES OF 1996.  
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, INCLUDING "DEVELOPMENTAL SPECIFICATIONS FOR HIGH PERFORMANCE CONCRETE FOR PRESTRESSED CONCRETE BEAMS" 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.  
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.  
CONCRETE IN ACCORDANCE WITH SECTION 8,  $f_c = 3,500$  PSI.  
PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEET 8.  
PRECAST ABUTMENT FOOTING CONCRETE IN ACCORDANCE WITH SECTION 8,  $f_c = 5,000$  PSI.

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

NOTE:  
POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

TRAFFIC CONTROL PLAN  
NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

## GENERAL NOTES:

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 22' X 17'-7" SINGLE SPAN TIMBER BRIDGE CONSTRUCTED IN 1940. NO KNOWN COPIES OF THE ORIGINAL PLAN EXIST. THE EXISTING BRIDGE SUPERSTRUCTURE CONSISTS OF TIMBER GIRDERS WITH A TIMBER DECK. THE EXISTING SUBSTRUCTURE CONSISTS OF TIMBER PILING AND TIMBER BACKWALLS. THE INTENT IS TO REPLACE THE EXISTING STRUCTURE WITH AN INNOVATIVE BRIDGE RESEARCH AND CONSTRUCTION (IBRC) ACCELERATED BRIDGE CONSTRUCTED WITH PRECAST ABUTMENT FOOTINGS AND PRECAST PRESTRESSED DECK BOX BEAMS

THE LUMP SUM BID FOR "REMOVAL OF EXISTING BRIDGE" SHALL INCLUDE THE REMOVAL OF THE EXISTING 22' X 17'-7" TIMBER SUPERSTRUCTURE AND SUBSTRUCTURE OF THE EXISTING BRIDGE.

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS, EXCEPT THAT THE EXISTING BRIDGE SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE STARTING DATE.

THIS BRIDGE IS DESIGNED FOR HS20-44 LOADING, PLUS 50 LBS. PER SQUARE FOOT OF ROADWAY FOR FUTURE OVERLAY.

THE BRIDGE CONTRACTOR IS ENCOURAGED TO TAKE FULL ADVANTAGE OF SPECIFICATION 1105.15 - VALUE ENGINEERING INCENTIVE PROPOSAL. A PAMPHLET AND CONCEPTUAL PROPOSAL FORM WILL BE AVAILABLE AT THE PRECONSTRUCTION CONFERENCE.

IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE STATE OR COUNTY.

THE BRIDGE CONTRACTOR IS TO INSTALL SUBDRAINS BEHIND THE ABUTMENTS AS DETAILED. THE SUBDRAINS SHALL BE 4" DIA. PERFORATED SUBDRAIN (POLYETHYLENE CORRUGATED TUBING). THE SUBDRAIN OUTLET WILL CONSIST OF A 6' LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED IN THESE PLANS.

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.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS  $\frac{5}{8}$  INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

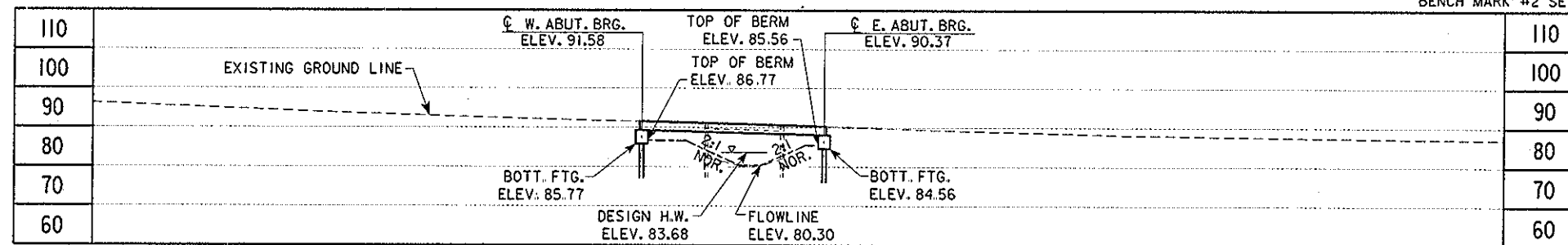
THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS  $\frac{5}{8}$  INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE 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

MADISON COUNTY SHALL BE RESPONSIBLE FOR THE CONSTRUCTION STAKING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF STAKES AND MARKS IN ACCORDANCE WITH STANDARD SPECIFICATION 1105.06.

SOUNDING AND TEST BORING DATA SHOWN ON PLANS WERE ACCUMULATED FOR DESIGNING AND ESTIMATING PURPOSES. THEIR APPEARANCE ON THE PLAN DOES NOT CONSTITUTE A GUARANTEE THAT CONDITIONS OTHER THAN THOSE INDICATED WILL NOT BE ENCOUNTERED.

DESIGN FOR 0° SKEW  
46'-8 X 24' PRECAST PRETENSIONED  
BOX GIRDER BRIDGE  
46'-8 END SPANS  
GENERAL NOTES AND QUANTITIES  
STA. 99+97  
MADISON COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 1 OF 12 FILE NO. 30139 DESIGN NO. 106  
APRIL 2006



BENCH MARK #1 SET 60d SPIKE IN POWER POLE, 27.93 RT., STA. 98+35.18, ELEV. 100.00  
 BENCH MARK #2 SET 60d SPIKE IN POWER POLE, 25.56 RT., STA. 101+38.04, ELEV. 85.22  
 NOTE: ASSUMED DATUM

2.59%  
 W. ABUT. ELEV. 91.58 E. ABUT. ELEV. 90.37  
**PROPOSED PROFILE**  
**290TH STREET**

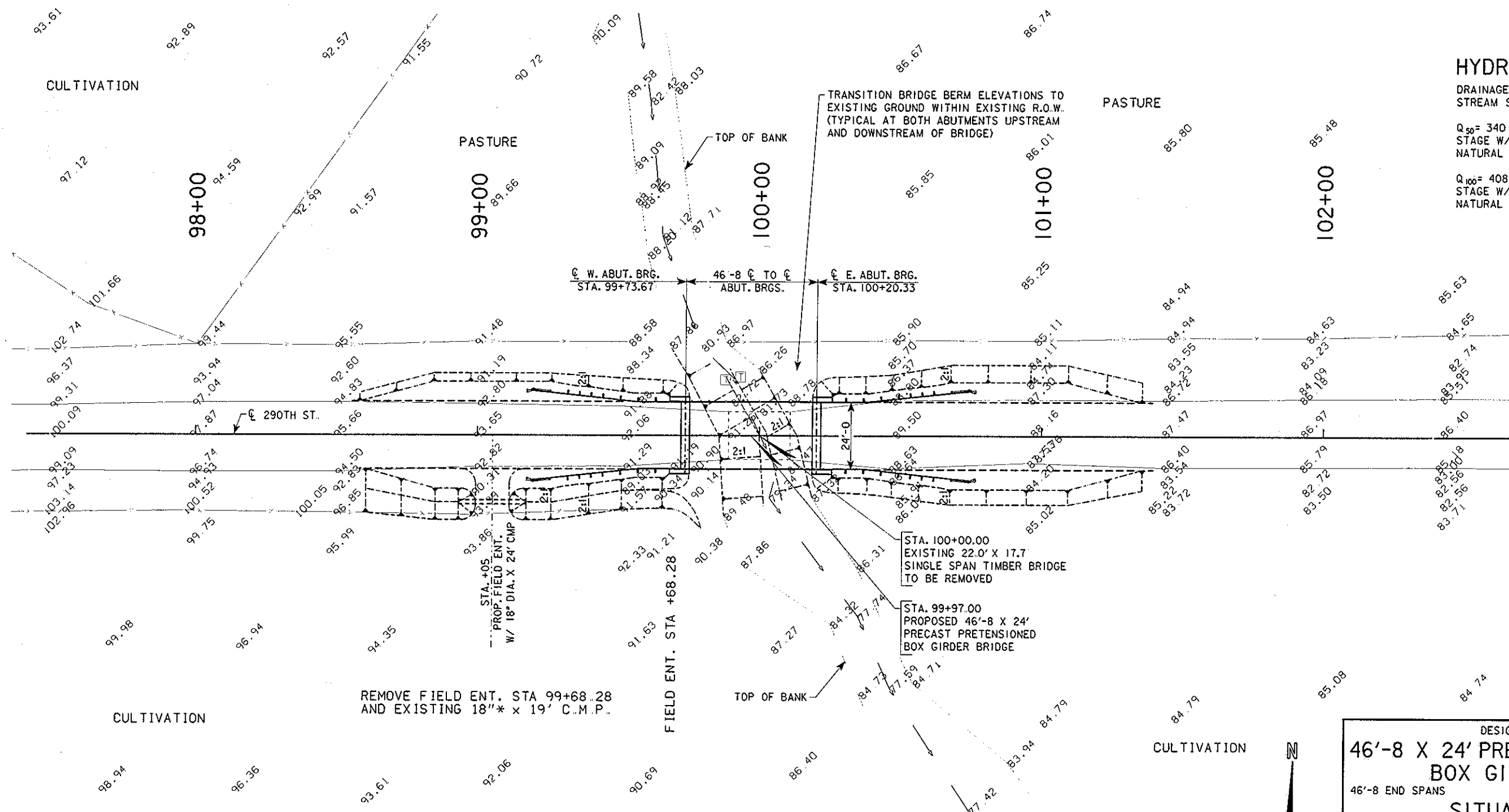
### LONGITUDINAL SECTION ALONG C ROADWAY

### HYDRAULIC DATA

DRAINAGE AREA= 212 ACRES HILLY  
 STREAM SLOPE= 79 FT./MI.

Q<sub>50</sub>= 340 CFS  
 STAGE W/BACKWATER= 83.80  
 NATURAL STAGE AT BRIDGE= 83.68

Q<sub>100</sub>= 408 CFS  
 STAGE W/BACKWATER= 84.11  
 NATURAL STAGE AT BRIDGE= 83.97



### LOCATION

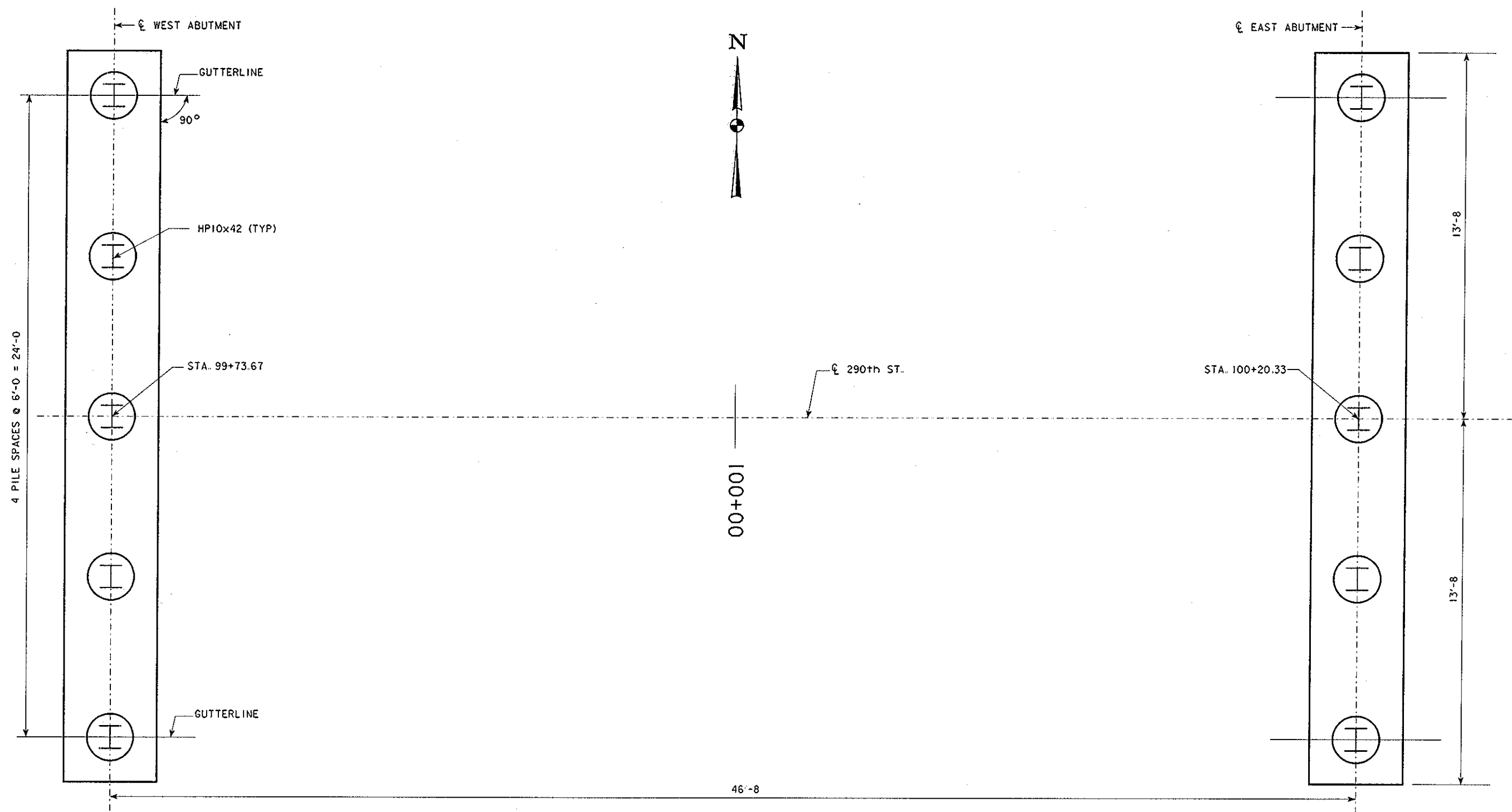
290TH STREET OVER  
 N. BRANCH CLANTON CREEK  
 T-74 N R-28 W  
 SECTION 12  
 MONROE TOWNSHIP  
 MADISON COUNTY

### SITUATION PLAN

0 ENGLISH 40  
 SCALE RATIO: 1:40

DESIGN FOR 0° SKEW  
**46'-8 X 24' PRECAST PRETENSIONED**  
**BOX GIRDER BRIDGE**  
 46'-8 END SPANS  
**SITUATION PLAN**  
 STA. 99+97 APRIL 2006  
**MADISON COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 2 OF 12 FILE NO. 30139 DESIGN NO. 106

BENCH MARK #1 SET 60d SPIKE IN POWER POLE, 27.93 RT., STA. 98+35.18, ELEV. 100.00  
BENCH MARK #2 SET 60d SPIKE IN POWER POLE, 25.56 RT., STA. 101+38.04, ELEV. 85.22  
NOTE: ASSUMED DATUM



STAKING DIAGRAM

DESIGN FOR 0° SKEW

46'-8 X 24' PRECAST PRETENSIONED  
BOX GIRDER BRIDGE

46'-8 END SPANS

STAKING DIAGRAM

STA. 99+97

MADISON COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 12 FILE NO. 30139 DESIGN NO. 106

APRIL 2006

REINFORCING BAR LIST

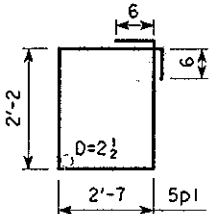
ONE PRECAST ABUTMENT FOOTING

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8f1	ABUTMENT FOOTING LONGITUDINAL - FACES	—	8	26'-11"	575
5f2	ABUTMENT FOOTING LONGITUDINAL - TOP	—	8	4'-0"	34
5p1	ABUTMENT HOOPS	□	52	10'-6"	570
*5h3	ABUTMENT WING, HORIZ.	—	16	3'-10"	64
*5h4	ABUTMENT TO WING ANCHOR	—	16	1'-5"	24
REINFORCING STEEL (LBS.)					1267

NOTE: THE 5h4 BARS ARE SLICED WITH MECHANICAL SPLICERS TO THE 5h3 BARS. MECHANICAL SPLICERS SHALL BE IN ACCORDANCE WITH MATERIALS IM 451, APPENDIX E.

THE PILE SPIRAL AND SPIRAL SPACER ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

BENT BAR DETAILS



5p1

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

PRECAST ABUTMENT FOOTING & PILE NOTES:

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

THE DESIGN BEARING FOR THE ABUTMENT PILES IS 33 TONS.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL AND POROUS BACKFILL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE".

THE PRECAST ABUTMENT FOOTING PICK POINT OR LIFTING LOOPS SHALL BE DESIGNED BY THE PRECAST MANUFACTURER. FLEXURAL EFFECTS SHALL BE CONSIDERED IN THE DESIGN.

PICK POINTS OR LIFTING LOOP LOCATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION.

THE METHOD OF SUPPORTING THE PRECAST ABUTMENT FOOTING DURING ERECTION SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO THE ERECTION. SPECIAL EMPHASIS IS PLACED ON THE CONTRACTORS METHOD OF ELEVATION CONTROL.

THE STRUCTURAL CONCRETE (MISC.) USED TO FILL THE ABUTMENT PILING ENCASEMENTS SHALL BE CLASS C-4 CONCRETE WITH A HIGH RANGE WATER REDUCER. THE MAXIMUM SLUMP ACHIEVED WITH WATER SHALL BE 2 INCHES. THE HRWR SHALL BE ADDED AT THE POUR SITE. THE MAXIMUM ALLOWABLE SLUMP AFTER ADDITION OF THE HRWR SHALL BE 7 INCHES. COARSE AGGREGATE SHALL BE 1/2" TOP SIZE.

OTHER MIXES MAY BE CONSIDERED PROVIDING THEY HAVE BEEN REVIEWED AND APPROVED BY THE DISTRICT MATERIALS ENGINEER.

DISTRICT MATERIALS WILL PROVIDE COMPRESSIVE STRENGTH TESTING OF THE CONCRETE USED TO FILL THE ABUTMENT PILING ENCASEMENTS. BLOCKING AND TEMPORARY SHORING SHALL NOT BE REMOVED UNTIL 3500 PSI HAS BEEN ACHIEVED.

FINAL PILE HEAD POSITIONS SHALL NOT DEVIATE FROM THE LOCATION DESIGNATED IN THESE PLANS BY MORE THAN 3" IN ANY DIRECTION IN ORDER TO ALLOW THE PRECAST FOOTING TO BE INSTALLED.

BENCH MARK #1 SET 60d SPIKE IN POWER POLE, 27.93 RT., STA. 98+35.18, ELEV. 100.00  
BENCH MARK #2 SET 60d SPIKE IN POWER POLE, 25.56 RT., STA. 101+38.04, ELEV. 85.22  
NOTE: ASSUMED DATUM

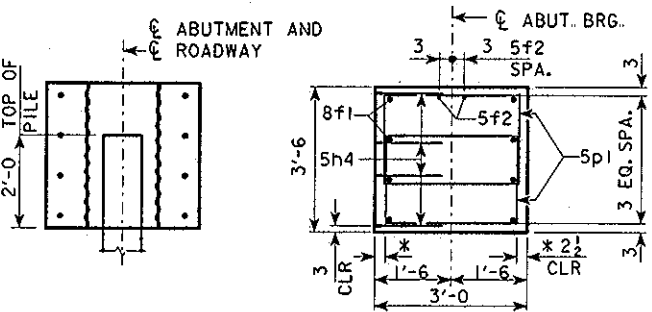
ESTIMATED QUANTITIES  
ONE PRECAST ABUTMENT FOOTING

ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CY	9.4
STRUCTURAL CONCRETE (MISC.)	CY	1.6
REINFORCING STEEL	LBS	1267
EXCAVATION CLASS 20	CY	33.1
21" φ CMP	LF	18.0

PILE QUANTITIES  
BOTH ABUTMENTS

E. ABUT.	5 - HP10X42 @ 35'-0"	175'-0"
W. ABUT.	5 - HP10X42 @ 35'-0"	175'-0"
TOTAL		350'-0"

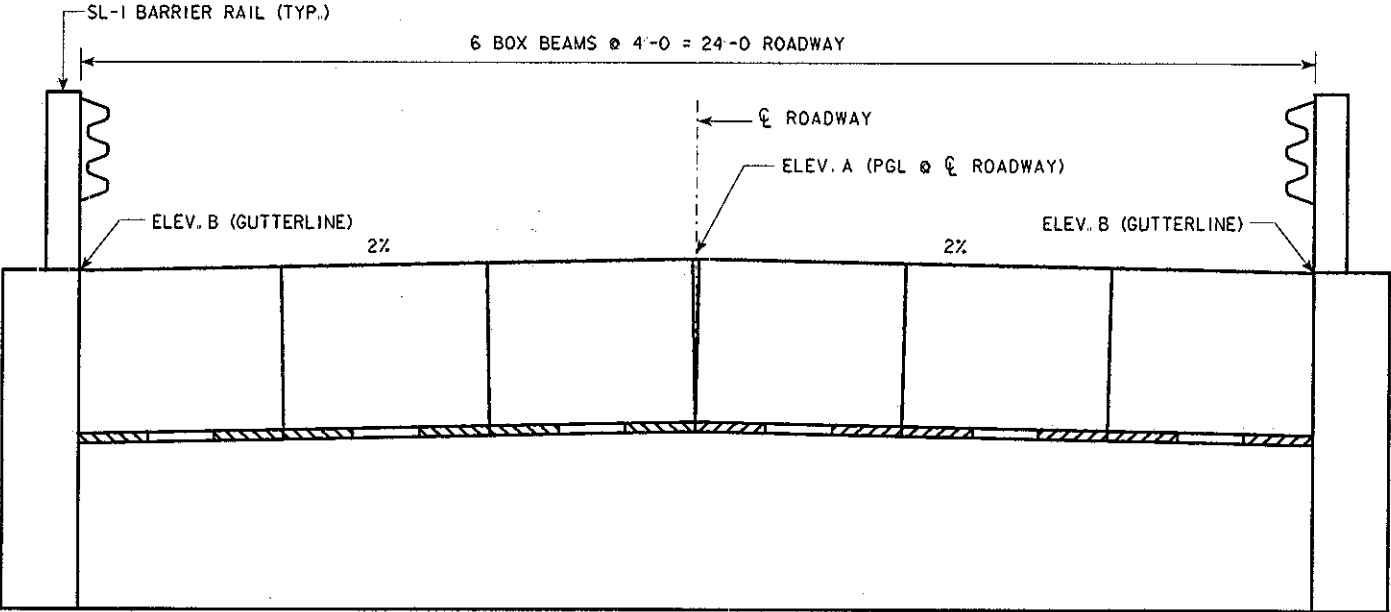
PRECAST ABUTMENT WEIGHT = 19.21 TONS



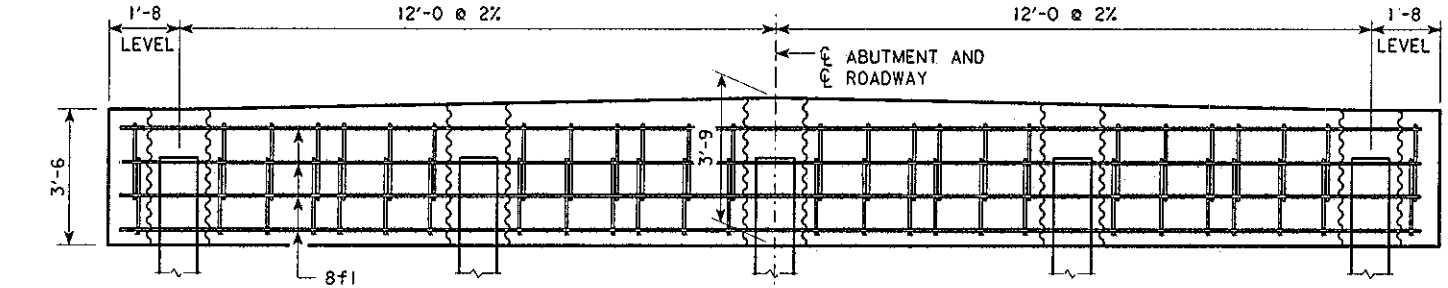
SECTION A-A

SECTION B-B

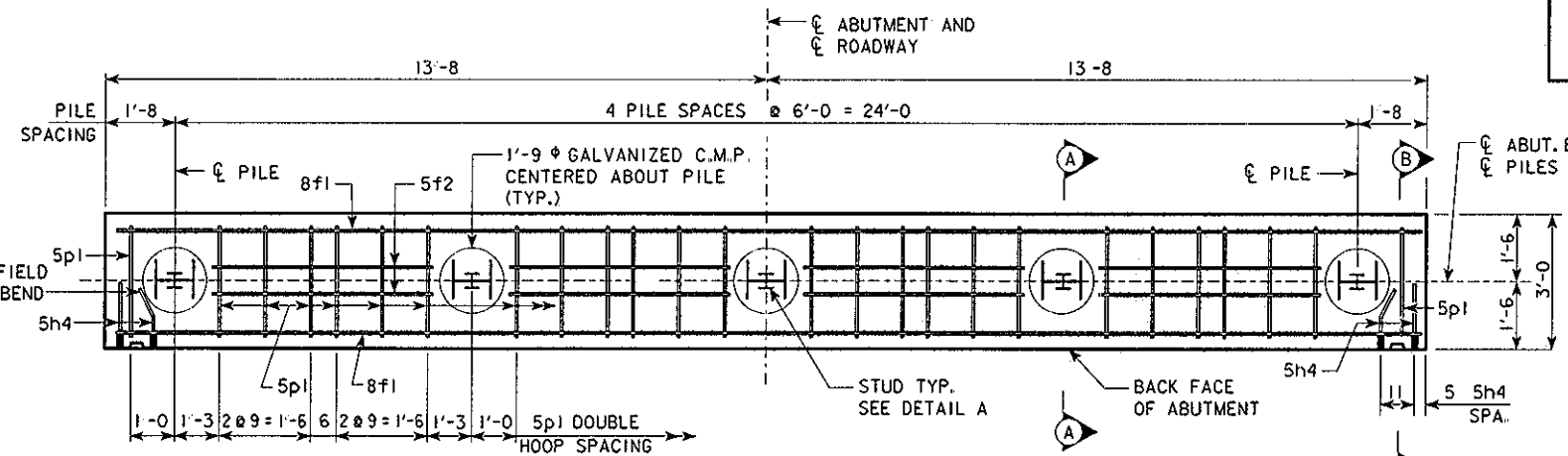
NOTE: PILE SPIRALS NOT SHOWN.



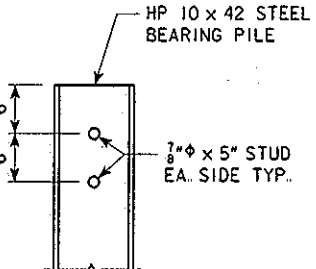
REAR ELEVATION AT ABUTMENT



ABUTMENT ELEVATION



ABUTMENT PILE PLAN

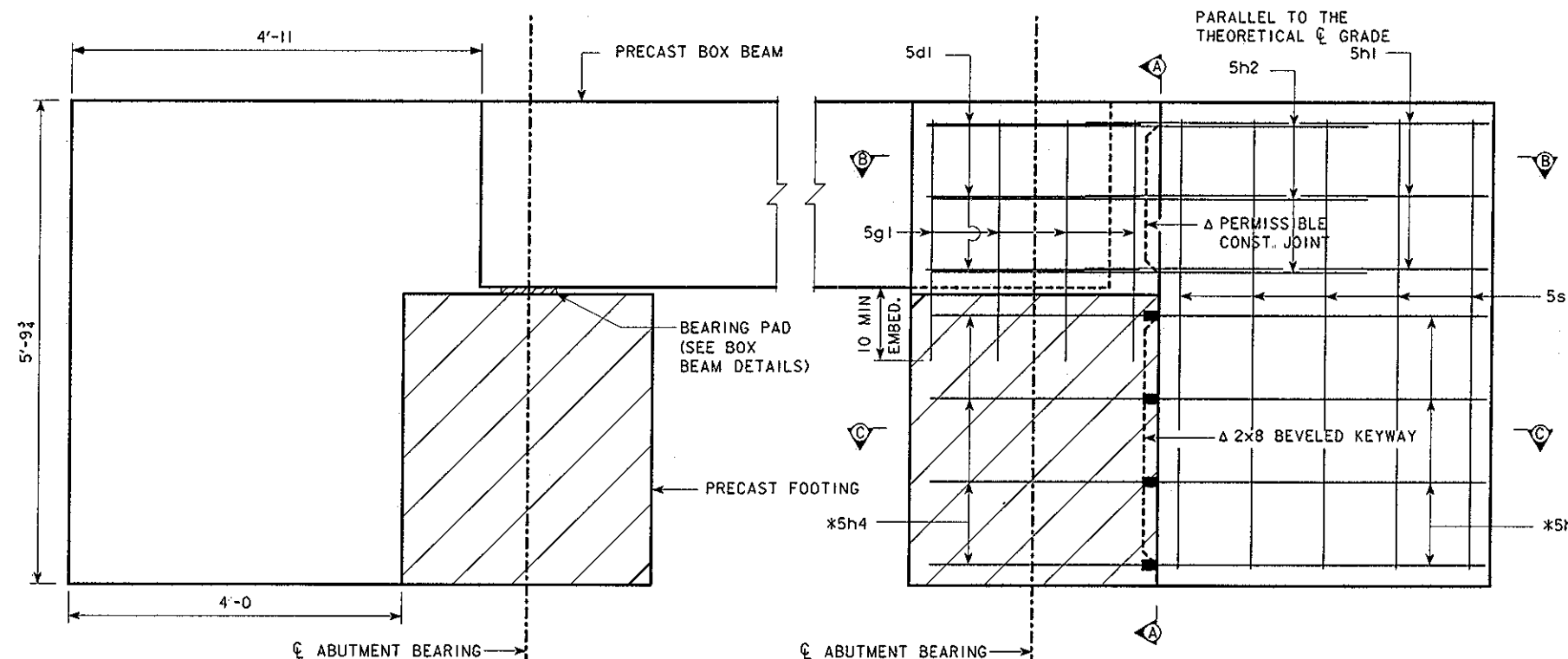


DETAIL A

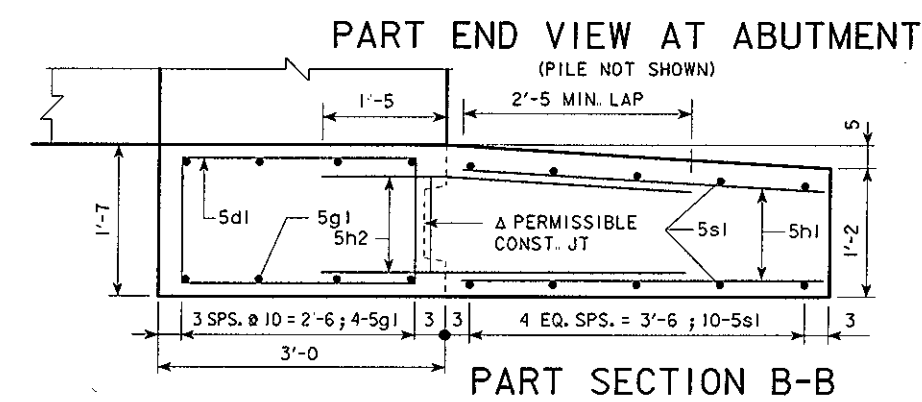
NOTE: 4 STUDS PER PILE.

TABLE OF ABUTMENT ELEVATIONS		
ELEV.	W. ABUT.	E. ABUT.
A	91.58	90.37
B	91.33	90.12
BOTT. OF FOOTING	85.52	84.31

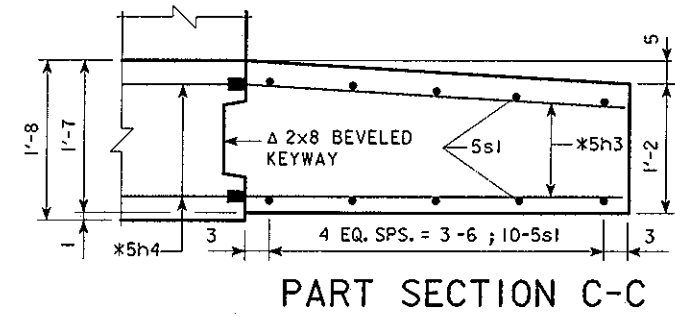
DESIGN FOR 0° SKEW  
**46'-8 X 24' PRECAST PRETENSIONED BOX GIRDER BRIDGE**  
46'-8 END SPANS  
**PRECAST ABUTMENT DETAILS**  
STA. 99+97  
**MADISON COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 4 OF 12 FILE NO. 30139 DESIGN NO. 106  
APRIL 2006



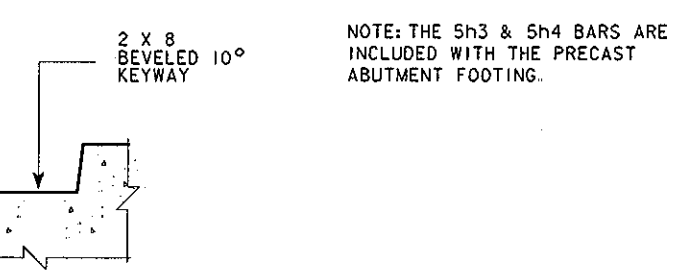
PART LONGITUDINAL SECTION NEAR GUTTER  
(PILE NOT SHOWN)



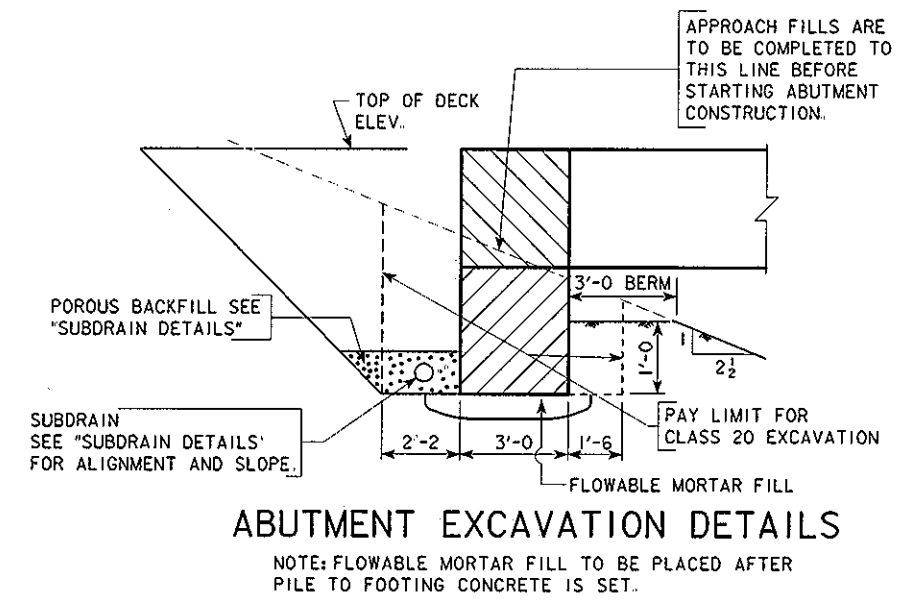
PART END VIEW AT ABUTMENT  
(PILE NOT SHOWN)



PART SECTION B-B

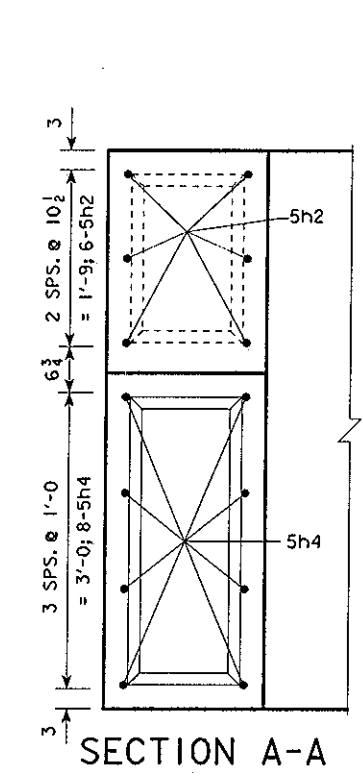


PART SECTION C-C



ABUTMENT EXCAVATION DETAILS

Δ BEVELED KEYWAY DETAIL



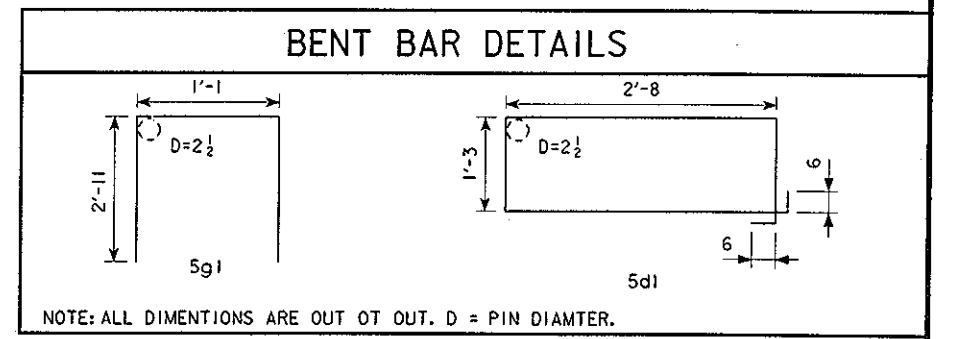
SECTION A-A

DOWEL SETTING NOTE:  
THE 5g1 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP UNLESS NOTED OTHERWISE. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. EITHER OF THE FOLLOWING SYSTEMS MAY BE USED AS A BONDING AGENT FOR VERTICAL DOWELS:

- A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- B. HYDRAULIC CEMENT GROUT SYSTEMS. DRILLED HOLES ARE TO BE 2 1/2 TIMES THE DOWL DIAMETER AND ARE TO BE BLOWN CLEAN WITH COMPRESSED AIR IMMEDIATELY PRIOR TO PLACING GROUT. THE HYDRAULIC CEMENT GROUT SHALL BE ONE OF THOSE APPROVED IN MATERIALS I.M. 491.13 AND SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

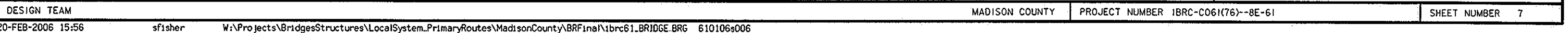
CONCRETE PLACEMENT QUANTITIES	
SECTION	TOTAL
WINGS (4 @ 1.60)	6.4
TOTAL (C.Y.)	6.4

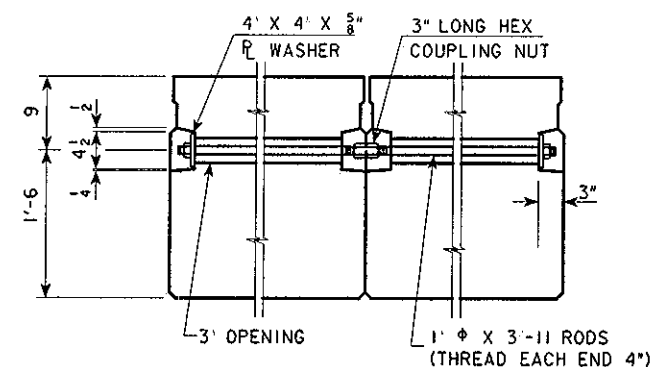
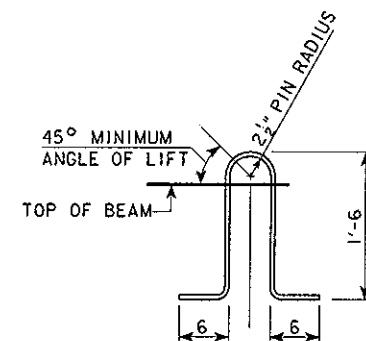
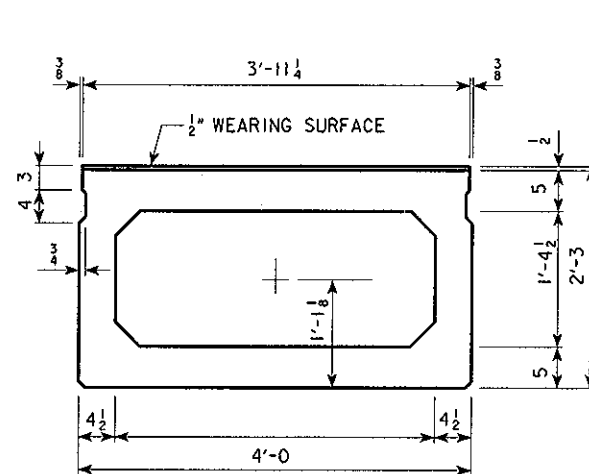
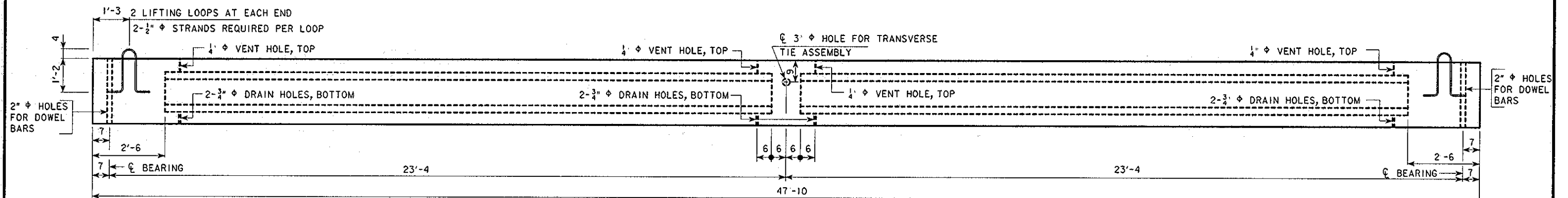
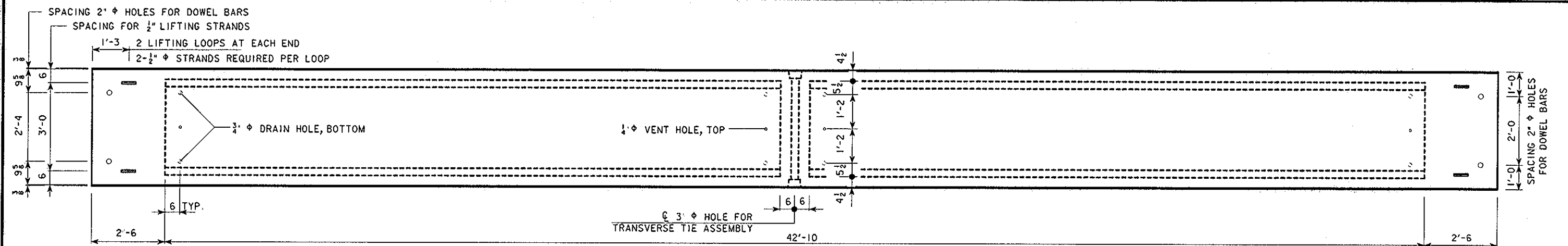
REINFORCING BAR LIST-TWO ABUTMENTS					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5d1	ABUTMENT, HORIZONTAL	□	12	8'-10"	111
5g1	ABUTMENT, VERTICAL DOWEL	□	16	6'-11"	115
5h1	WING, HORIZONTAL	—	24	3'-8"	92
5h2	ABUTMENT TO WING, HORIZONTAL	—	24	4'-0"	100
5s1	WING, VERTICAL	—	40	5'-5"	226
#2	PILE SPIRAL		10	33'-0"	55
	SPIRAL SPACER L 1/2 x 1/2 x 1/2 x 0.70	—	20	1'-10"	26
REINFORCING STEEL (LBS.)					725



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

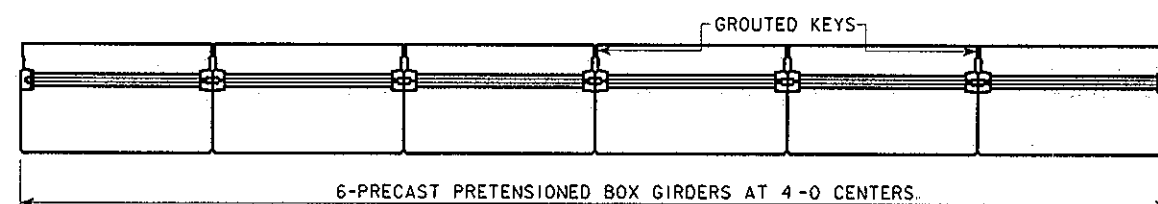
DESIGN FOR 0° SKEW  
46'-8 X 24' PRECAST PRETENSIONED BOX GIRDER BRIDGE  
46-8 END SPANS  
PRECAST ABUTMENT DETAILS  
STA. 99+97  
MADISON COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 5 OF 12 FILE NO. 30139 DESIGN NO. 106  
APRIL 2006




$$\begin{aligned} \text{AREA} &= 638.8 \text{ in}^2 \\ \bar{y}_b &= 13.15 \text{ in.} \\ I &= 59,998 \text{ in}^4 \\ S_b &= 4,561.9 \text{ in}^3 \\ S_t &= 4,494.9 \text{ in}^3 \end{aligned}$$

### BEAM SECTION PROPERTIES

NOTE: SECTION PROPERTIES DO NOT  
INCLUDE  $\frac{1}{2}$ " WEARING SURFACE.



BOX GIRDER DATA											
BEAM	SPAN LENGTH ft - in	BEARING ft - in	OVERALL BEAM LENGTH (L) ft - in	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL (LBS.)
					STRAIGHT	DEFLECTED					
BOX	46'-8	47'-10	48'-0	13	1	390	18.5	9.1	121		

DESIGN FOR 0° SKEW  
46'-8 X 24' PRECAST PRETENSIONED  
BOX GIRDER BRIDGE  
46-8 END SPANS  
BOX GIRDER DETAILS  
STA. 99+97 APRIL 2006  
MADISON COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 7 OF 12 FILE NO. 30139 DESIGN NO. 106



NOTES:

THESE GIRDERS ARE DESIGNED FOR HS20-44 LOADING PLUS 50 LBS. PER SQUARE FOOT FOR FUTURE WEARING SURFACE.  
ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.  
TOTAL INITIAL PRESTRESS FOR BOX GIRDERS IS BASED ON 72.664% f's.  
f's = 270 ksi AND A\_s = 0.153 SQ. IN.

WHEN A TIGHT, UNIFORM SURFACE HAS BEEN ACHIEVED, THE SURFACE SHALL BE GIVEN A SUITABLE GROOVING USING A MECHANICAL DEVICE SUCH AS A WIRE BROOM OR A COMB. THE BROOM OR COMB SHALL HAVE A SINGLE ROW OF TINES 1/8" IN WIDTH. THE DEPTH OF THE GROOVE IN THE PLASTIC CONCRETE SHALL BE 1/8" AS A TARGET WITH A +/- 1/16" TOLERANCE. GROOVING SHALL BE TRANSVERSE TO THE CENTERLINE OF THE ROADWAY. TRANSVERSE GROOVING SHALL BE RANDOMLY SPACED FROM 1/8 INCH TO 1 1/8 INCHES WITH NO MORE THAN 50% OF THE SPACINGS EXCEEDING 1/2 INCH AND WITH A MINIMUM OF FOUR DIFFERENT SPACINGS IN A 2' WIDTH. THIS OPERATION SHALL BE DONE AT A TIME AND MANNER THAT THE DESIRED TEXTURE WILL BE ACHIEVED WHILE MINIMIZING THE DISPLACEMENT OF THE LARGER AGGREGATE PARTICLES.

UNLESS OTHERWISE NOTED ALL GIRDERS ARE TO BE INCREASED IN LENGTH BY .0005L TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.  
FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ART. 2407.13 OF STD. SPEC., EXCEPT THE OVERHANG MAY BE INCREASED TO A MAXIMUM OF 10 FEET.  
BEARINGS SHALL BE AS DETAILED ON THIS SHEET. 50 DUROMETER NEOPRENE SHALL BE USED FOR BEARING PADS.

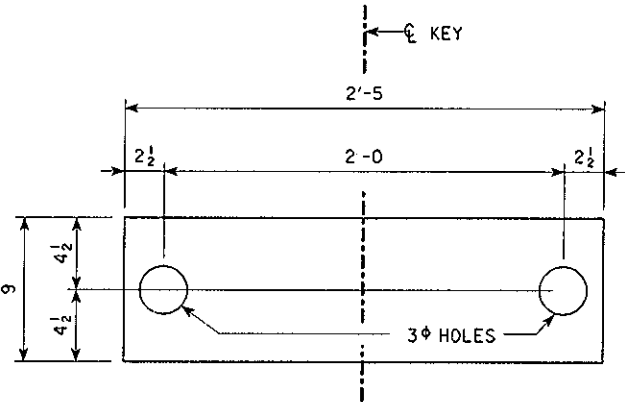
LIFTING LOOPS SHALL CONSIST OF 2-1/2" x 270 ksi STRANDS AND SHALL BE PLACED AS SHOWN AS. AFTER PROPER PLACEMENT OF GIRDERS, CONTRACTOR SHALL CUT LIFTING LOOPS OFF AT OR SLIGHTLY BELOW SURFACE OF GIRDER.

THE 1" x 1" RODS IN THE TRANSVERSE TIE ASSEMBLY SHALL BE TIGHTENED TO A SNUG FIT AND THE THREADS SET. POCKETS THAT RECEIVE TRANSVERSE TIE BAR ON OUTSIDE SHALL BE FILLED WITH GROUT AFTER TRANSVERSE TIE ASSEMBLY IS IN PLACE.

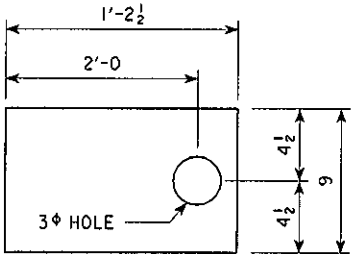
THE 1" x 1" THREADED RODS SHALL BE IN ACCORDANCE WITH ASTM A 307-04, GRADE A. STRUCTURAL STEEL FOR 5/8" PLATE WASHERS SHALL BE IN ACCORDANCE WITH ASTM A 709, GRADE 50. HEX NUTS FOR 1" x 1" THREADED RODS SHALL BE IN ACCORDANCE WITH A 563, GRADE A. HEX COUPLING NUTS SHALL BE IN ACCORDANCE WITH STANDARD 1F1-128 2000 UNDER ANSI/ASME B18.22.

THE BEARING SEAT SURFACES SHALL BE ADJUSTED BY SHIMMING TO ASSURE FIRM AND EVEN BEARING. TWO 1/4" NEOPRENE ADJUSTING SHIMS WITH THE DIMENSIONS OF THE EXTERIOR BEARING PAD SHALL BE PROVIDED FOR EACH BEARING.

KEYWAY SURFACES SHALL BE CLEANED TO REMOVE FORM OIL OR OTHER BOND BREAKING MATERIAL PRIOR TO SHIPMENT OF THE BEAMS. CLEANING SHALL BE DONE BY SANDBLASTING THE KEYWAY AREAS BETWEEN THE TOP OF THE BEAM AND THE BOTTOM OF THE KEY.

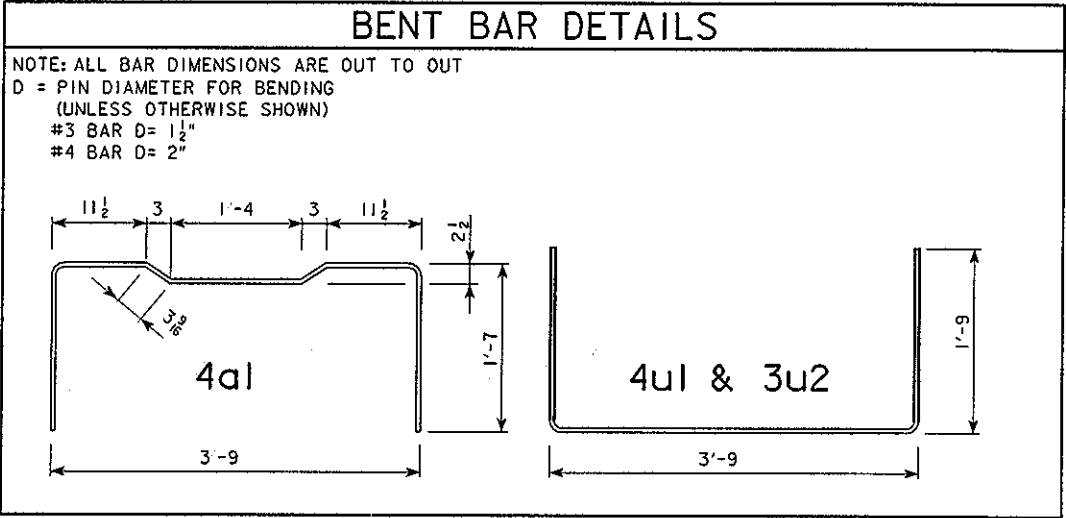


BEARING PAD - INTERIOR  
(10 REQUIRED)



BEARING PAD - EXTERIOR  
(4 REQUIRED)

REINFORCING BAR LIST				
BAR	SHAPE	NO.	LENGTH	WEIGHT
4a1		56	7'-1	265
3a2		54	3'-8	74
5b1		5	47'-7	248
5b2		8	9'-8	80
4b3		6	47'-7	191
4u1		8	7'-3	39
3u2		48	7'-3	131
W.W.F.		2	45X25	10
TOTAL WT. (LBS.)				1218



DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002:  
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.  
CONCRETE IN ACCORDANCE WITH SECTION 9, f'c = 5000 psi.  
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 9, f's = 270,000 psi.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.  
DESIGN: A.A.S.H.T.O., SERIES OF 2002, WITH MINOR MODIFICATIONS.

DESIGN FOR 0° SKEW

46'-8 X 24' PRECAST PRETENSIONED BOX GIRDER BRIDGE

46'-8 END SPANS

BOX GIRDER DETAILS

STA. 99+97

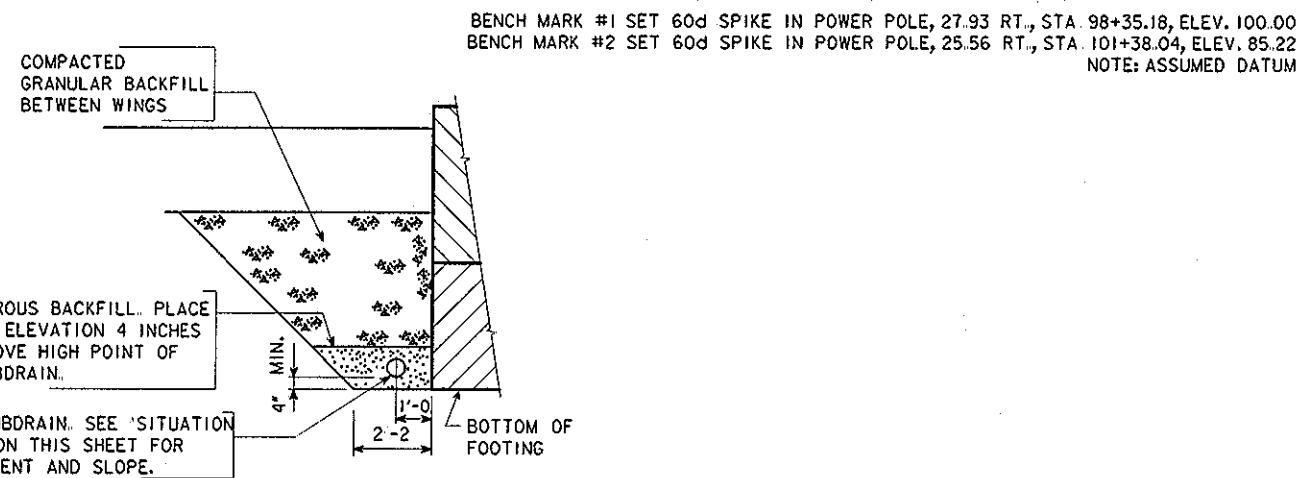
MADISON COUNTY

APRIL 2006

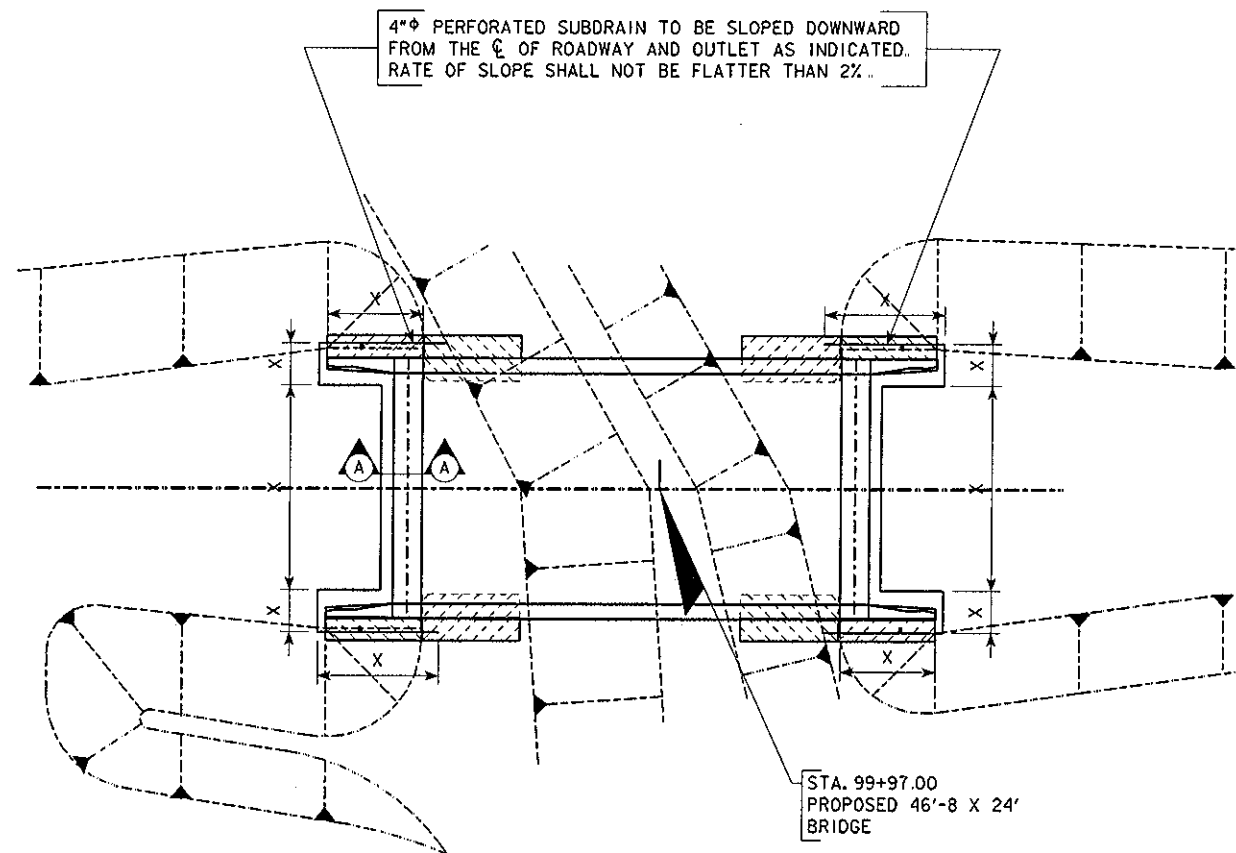
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 12 FILE NO. 30139 DESIGN NO. 106

ENGLISH FORESLOPE PROTECTION BRIDGES.DGN 1007C - THIS SHEET ISSUED 06-02 FOR WATER CROSSINGS.



## GRANULAR BACKFILL DETAILS



## SUBDRAIN NOTES :

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

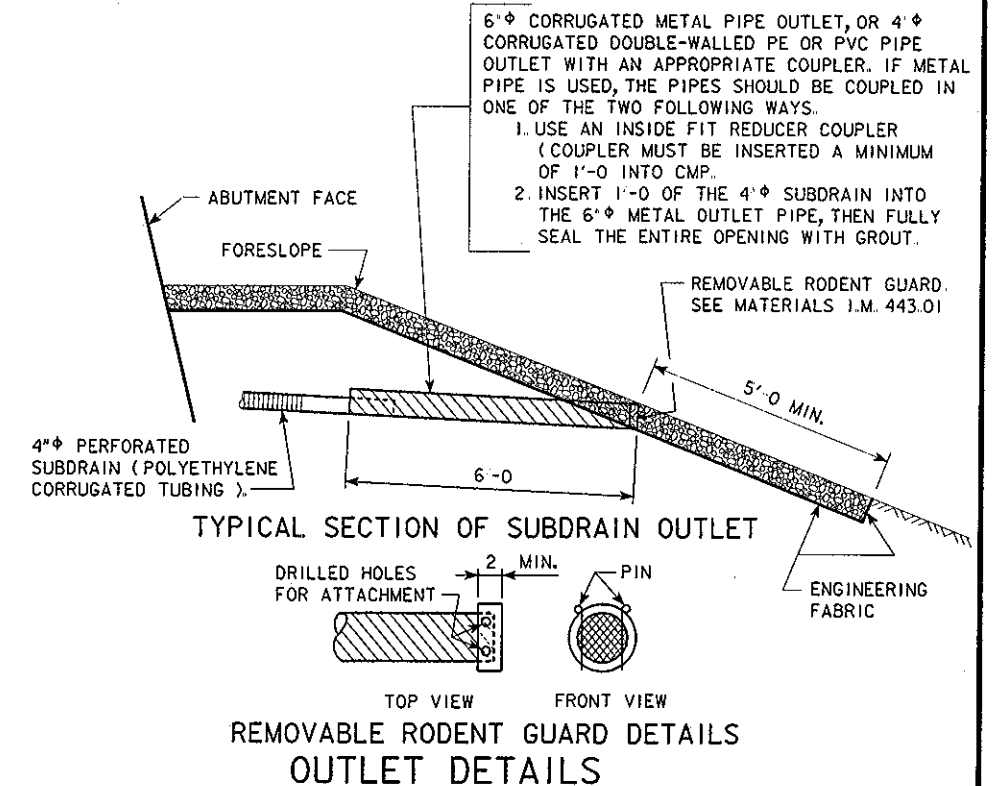
THE SUBDRAINS SHALL BE 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B OF THE CURRENT I.D.O.T. STANDARD SPECIFICATION. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0 LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID. NO EXTRA PAYMENT WILL BE MADE.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

## SUBDRAIN OUTLET ELEVATIONS

LOCATION	ELEVATION
WEST ABUTMENT	AS DIRECTED BY ENGINEER IN FIELD
EAST ABUTMENT	



DESIGN FOR 0° SKEW

**46'-8 X 24' PRECAST PRETENSIONED BOX GIRDER BRIDGE**

46'-8 END SPANS

**SUBDRAIN DETAILS**

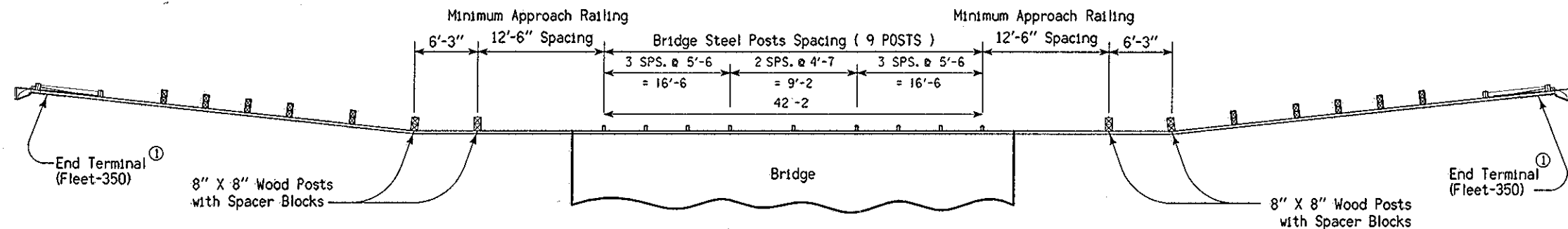
STA. 99+97

**MADISON COUNTY**

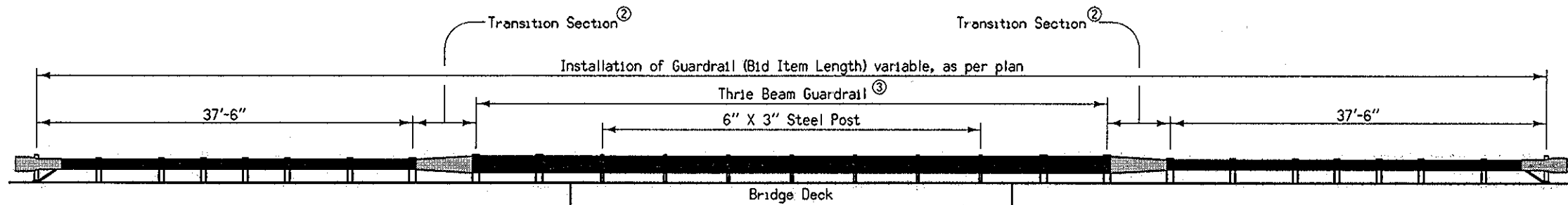
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 12 FILE NO. 30139 DESIGN NO. 106

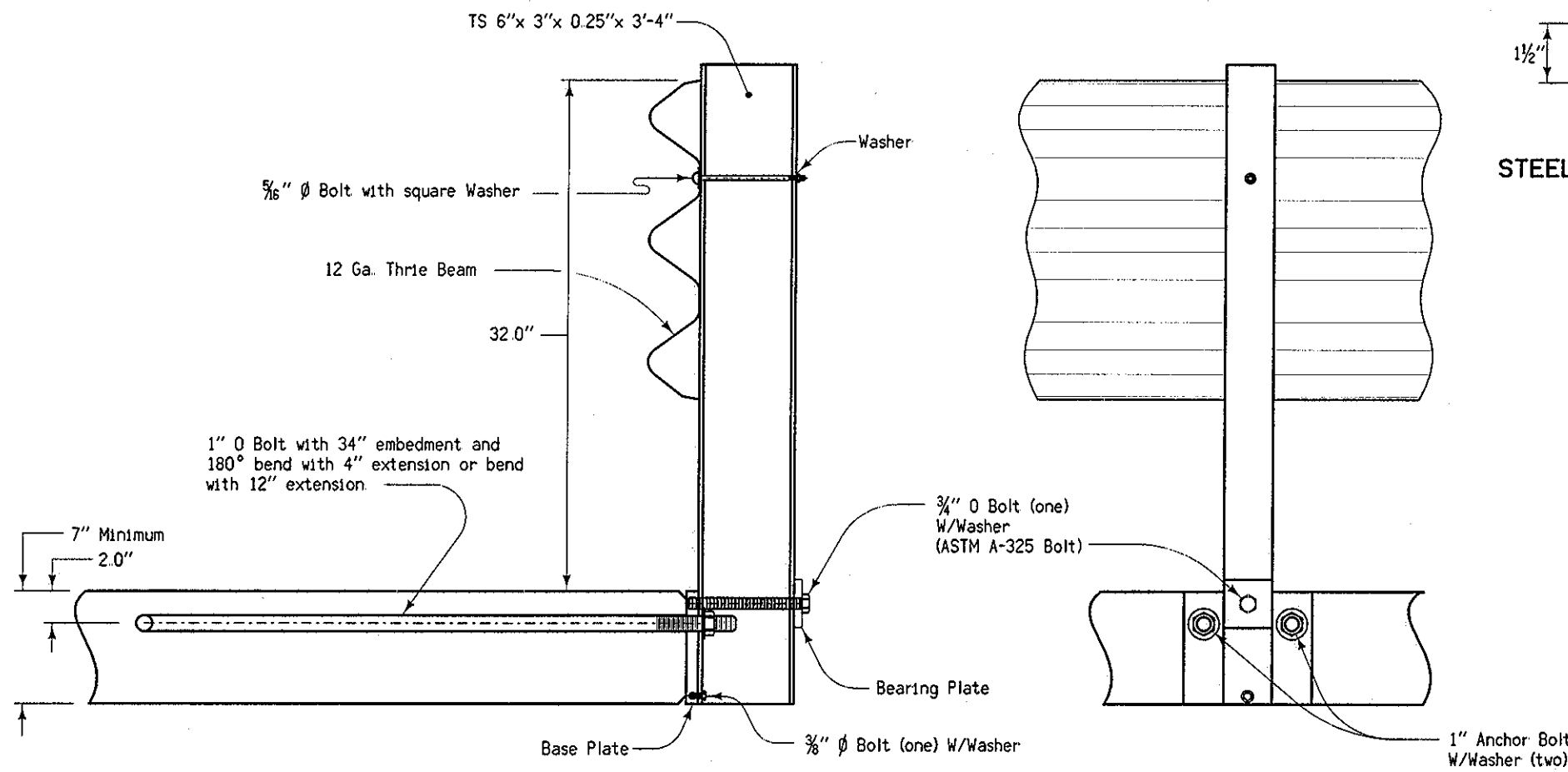
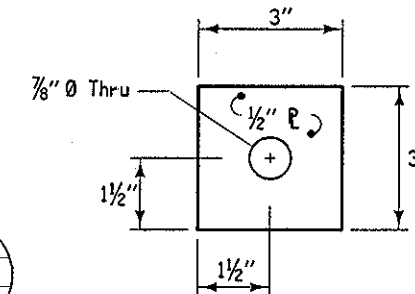
APRIL 2006



PLAN VIEW



TYPICAL SECTION AT BRIDGE



END VIEW

SIDE VIEW

TYPICAL BRIDGE RAILING

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.

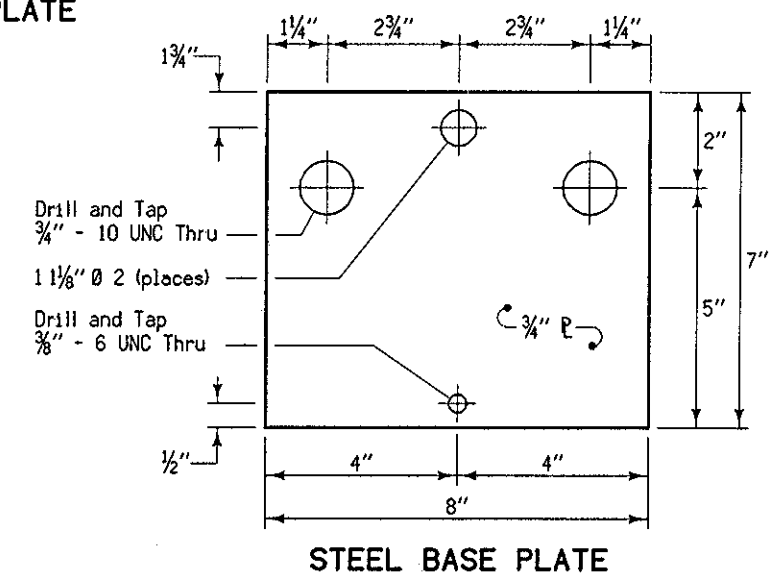
Guardrail shall be lapped towards the obstacle.

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

**46'-8 X 24' PRECAST PRETENSIONED BOX GIRDER BRIDGE**

46'-8 END SPANS

**SERVICE LEVEL I BRIDGE RAIL DETAILS**

STA. 99+97

**MADISON COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 12 FILE NO. 30139 DESIGN NO. 106

APRIL 2006



# LOG OF BORING NO. 1

Page 1 of 2

CLIENT		PROJECT							
MADISON COUNTY ENGINEER		REPLACEMENT BRIDGE - IBRC (61)							
SITE		PROJECT							
MADISON COUNTY, IOWA		REPLACEMENT BRIDGE - IBRC (61)							
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N <sup>o</sup> BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT,pcf
	Approx. Boring Location: 20' East of existing east abutment. 7' South of centerline.								
	Approx. Surface Elev.: 90 ft								
	8 Inches Gravel at Surface	80.6			HS				
	FILL: LEAN CLAY With Sand, Trace Organics								
	Dark Gray and Brown Gray								
	LEAN TO FAT CLAY, Trace Sand (IDOT CLASSIFICATION: FIRM SILTY CLAY)	82		1	SS	18	9		
	Dark Gray Stiff				HS				
	LEAN TO FAT CLAY, Trace Sand (IDOT CLASSIFICATION: FIRM SILTY CLAY)	82		1	SS	18	9		
	Dark Gray Stiff				HS				
	SANDY LEAN CLAY With Sand Seams (IDOT CLASSIFICATION: STIFF SANDY CLAY)	78		3	SS	18	7		
	Gray Brown Stiff				HS				
	FAT CLAY, Trace Sand and Organics (IDOT CLASSIFICATION: STIFF SILTY CLAY)	71		4	SS	18	7		
	Very Dark Gray Stiff				HS				
	FINE TO MEDIUM SAND, Trace Gravel	66		5	SS	18	28		
	Gray	65			HS				
	FAT CLAY With Sand, Trace Gravel (IDOT CLASSIFICATION: VERY FIRM SANDY GLACIAL CLAY)								
	Gray, Hard								
	SHALE *** With Limestone Stringers	60		6	SS	18	35		
	Gray				HS				
	LIMESTONE ***	56		7	SS	1	50/1"		
	Light Gray	55.6			HS				
	BOTTOM OF BORING								
	Auger Refusal at 34.5'								
	***Classification of rock material based on driller's observation of drilling characteristics during field operations and visual identification of samples obtained. Core samples and/or petrographic analysis may indicate other rock types.								

LOG OF BORING NO. 2

Page 1 of 2

CLIENT		PROJECT								
MADISON COUNTY ENGINEER		REPLACEMENT BRIDGE - IBRC (61)								
SITE		PROJECT								
MADISON COUNTY, IOWA		REPLACEMENT BRIDGE - IBRC (61)								
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N <sup>o</sup> BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	
Approx. Boring Location: 23' West of existing west abutment. 7' North of centerline										
Approx. Surface Elev.: 91.5 ft										
1	12 Inches Gravel at Surface	90.5			HS					
	FILL: LEAN CLAY, Trace Sand Brown and Dark Brown									
4	LEAN TO FAT CLAY, Trace Sand (IDOT CLASSIFICATION: STIFF SILTY CLAY) Brown Gray, Stiff	87.5								
				GL/CH 1	SS	16	7			
					HS					
8	SANDY LEAN CLAY With Sand Seams (IDOT CLASSIFICATION: FIRM SANDY CLAY) Gray Brown Very Stiff Cobble at About 9'	83.5								
				GL/SC 2	SS	18	21			
					HS					
13	LEAN TO FAT CLAY With Sand, Trace Gravel (IDOT CLASSIFICATION: FIRM GLACIAL CLAY) Dark Gray, Stiff	79.5								
				GL/CH 3	SS	18	12			
					HS					
23.5	FAT CLAY, Trace Sand and Organics (IDOT CLASSIFICATION: FIRM TO VERY FIRM GLACIAL CLAY) Dark Brown, Very Stiff	69								
				CH 5	SS	18	14			
					HS					
28	FAT CLAY With Sand, Trace Gravel (IDOT CLASSIFICATION: VERY FIRM GLACIAL CLAY) Gray, Very Stiff	63.5								
				CH 6	SS	18	24			
					HS					
33.5	LIMESTONE *** Light Gray With Shale Stringers to About 34'	58								
				7	SS	7	50/1"			
					HS					
37.3	BOTTOM OF BORING Auger Refusal at 37.2' ***Classification of rock material based on driller's observation of drilling characteristics during field operations and visual identification of samples obtained. Core samples and/or petrographic analysis may indicate other rock types.	54								
				8	SS	1	50/1"			

DESIGN FOR 0° SKEW  
46'-8 X 24' PRECAST PRETENSIONED  
BOX GIRDER BRIDGE  
46'-8 END SPANS  
SOIL BORINGS DETAILS  
STA. 99+97  
MADISON COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 12 OF 12 FILE NO. 30139 DESIGN NO. 106  
APRIL 2006