

LOG OF EXPLORATORY BORING Sheet of 1

Job Number: G2377 Boring No.: B-2
 Project: Providence Bridge Boring Location: STATION 11+12.4, 23' WEST
 Date Started: 10/3/08 Drill Type: HOLLOW STEM
 Date Completed: 10/3/08 Ground Elev.: 88.9

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION		USCS	Blow Counts SPT (N) Blows/Foot	Moisture Content, %	Dry Density (pcf)	% Saturation	Hand Penetrometer (TSF)	Unconfined Comp. Strength (TSF)	Liquid Limit %	Plastic Limit %	Plasticity Index %	Resistivity Test Ohm-cm
			Shelby Tube	Standard Split Spoon											
0-12	12 INCH GRAVEL LAYER														
12-5	SILTY SAND, Medium Brown, Fill				CL	6-5-3 N= 8									
5-10	STIFF SANDY CLAY, Medium Brown				CL	9-3-3 N= 6									
10-15	STIFF SILT, Dark Brown				CL	2-2-2 N= 4									
15-20	FIRM SILTY GLACIAL CLAY, Gray				CL	4-3-4 N= 7									
20-25						8-5-4 N= 9									
25-30						4-4-3 N= 7									
30-35						3-5-6 N= 11									
35-40	GLACIAL MATERIAL, Gray				CL	11-16-24 N= 40									
40-45						11-13-21 N= 34									
45-50	(Medium Brown)					9-16-20 N= 36									
50	END OF BORING AT 50 FEET					11-11-21 N= 32									
	FREE GROUNDWATER WAS ENCOUNTERED AT 18.3 FEET AT TIME OF DRILLING														

BORING TAKEN AT WEST ABUTMENT OF THE EXISTING BRIDGE

LOG OF EXPLORATORY BORING Sheet of 1

Job Number: G2377 Boring No.: B-1
 Project: Providence Bridge Boring Location: STATION 11+62.4, 27' EAST
 Date Started: 10/3/08 Drill Type: HOLLOW STEM
 Date Completed: 10/3/08 Ground Elev.: 86.8

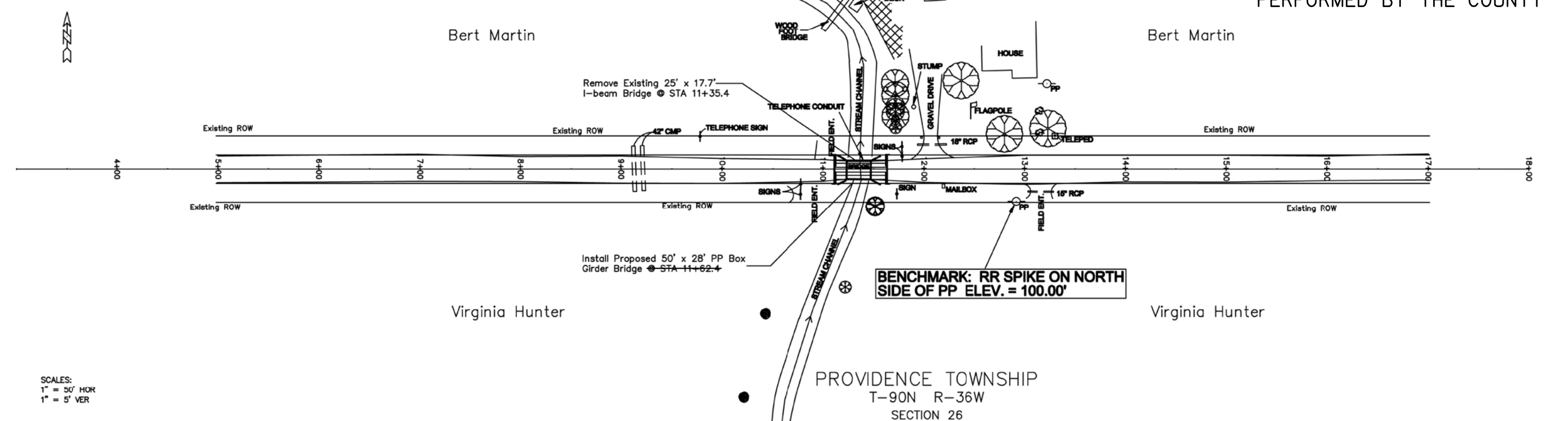
Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION		USCS	Blow Counts SPT (N) Blows/Foot	Moisture Content, %	Dry Density (pcf)	% Saturation	Hand Penetrometer (TSF)	Unconfined Comp. Strength (TSF)	Liquid Limit %	Plastic Limit %	Plasticity Index %	Resistivity Test Ohm-cm
			Shelby Tube	Standard Split Spoon											
0-12	12 INCH GRAVEL LAYER														
12-5	FIRM SILTY CLAY, Medium Brown, Fill				CL	7-4-8 N= 12									
5-10						13-5-3 N= 8									
10-15	FIRM-VERY FIRM GLACIAL CLAY, Medium Yellow Brown				CL	6-6-5 N= 11									
15-20	(Gray)					3-5-6 N= 11									
20-25						3-8-8 N= 16									
25-30						4-8-13 N= 21									
30-35	(Sand Seams)					4-8-13 N= 21									
35-40	GLACIAL MATERIAL, Medium Yellow Brown				CL	30-40-61 N= 107									
40-45	GRAVELLY SAND, Medium Yellow Brown				SW	20-14-18 N= 32									
45-50	GLACIAL MATERIAL, Gray				CL	3-14-20 N= 34									
50	END OF BORING AT 50 FEET					9-14-24 N= 38									
	FREE GROUNDWATER WAS ENCOUNTERED AT 18.3 FEET AT TIME OF DRILLING														

BORING TAKEN AT EAST ABUTMENT OF THE EXISTING BRIDGE

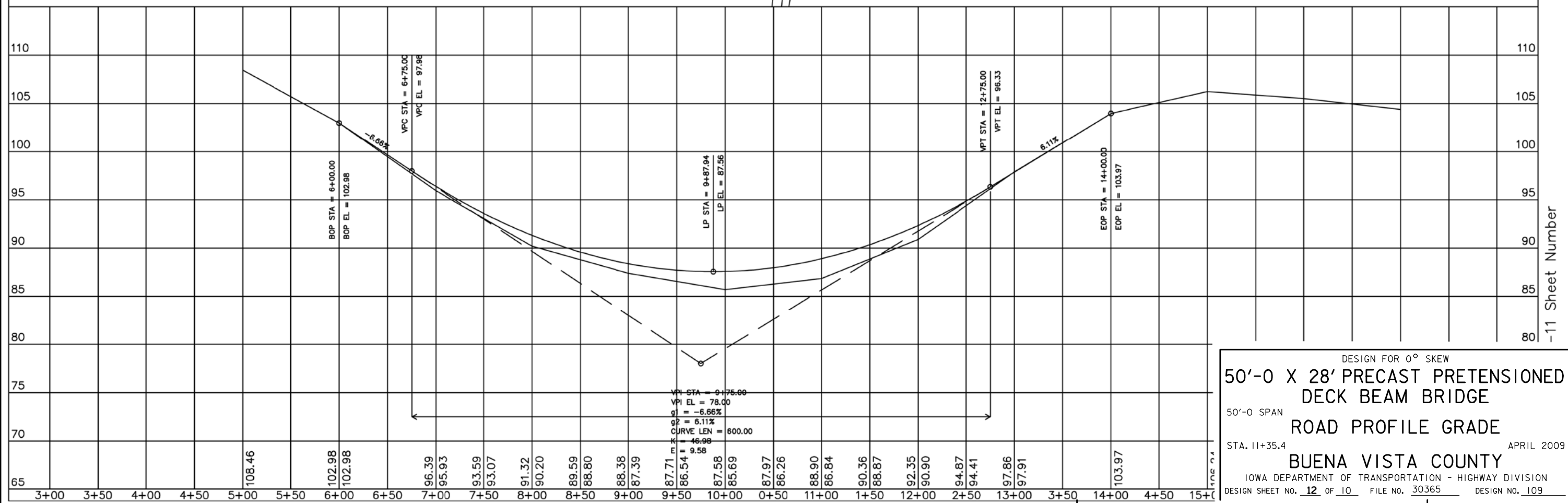
DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0 SPAN
SOILS INFORMATION
 STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 11 OF 10 FILE NO. 30365 DESIGN NO. 109

PROVIDENCE TOWNSHIP
T-90N R-36W
SECTION 23

FOR INFORMATION ONLY
ROAD GRADING WILL BE
PERFORMED BY THE COUNTY



SCALES:
1" = 50' HOR
1" = 5' VER



DESIGN FOR 0° SKEW
**50'-0 X 28' PRECAST PRETENSIONED
DECK BEAM BRIDGE**
50'-0 SPAN
ROAD PROFILE GRADE
STA. 11+35.4
BUENA VISTA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 12 OF 10 FILE NO. 30365 DESIGN NO. 109

ESTIMATED BRIDGE QUANTITIES

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT	TOTAL	AS BUILT QUANTITY
1	2102-2710070	EXCAVATION, CL 10, RDWY+BORROW	CY	10.0	
2	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.0	
3	2402-2720000	EXCAVATION, CL 20	CY	36.0	
4	2501-0201057	PILE, HP10x57	LF	600.0	
5	2505-4008200	INSTALLATION OF GUARDRAIL, BRIDGE	LF	87'-6	
6	2507-3250005	ENGINEER FABRIC	SY	160.0	
7	2507-6800061	REVTMENT, CLASS E	TON	200.0	
8	2533-4980005	MOBILIZATION	LS	1.0	
9	2599-9999005	PRECAST ABUTMENT FOOTING	EACH	2.0	
10	2599-9999005	PRETENSIONED PRECAST 48" X 21" DECK BEAM	EACH	7.0	
11	2599-9999005	PRECAST BACKWALL - ABUTMENT	EACH	4.0	
12					
13					
14					

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
4	2501-0201057	INCLUDES PROVIDING AND INSTALLING SHEAR STUDS
5	2505-4008200	INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING AND PLACING THE BRIDGE GUARDRAIL.
9	2599-9999005	<p>THIS ITEM INCLUDES ALL COSTS FOR FURNISHING AND PLACING THE PRECAST ABUTMENT FOOTING INCLUDING (ONE ABUTMENT - 8.7 C.Y. OF STRUCTURAL CONCRETE, 1384 LBS. REINFORCING STEEL, WITH MECHANICAL SPLICERS FOR THE BACKWALL, 18.0 L.F. OF 21" CMP, AND 1.5 C.Y. OF STRUCTURAL CONCRETE TO BACKFILL THE PILE VOIDS.)</p> <p>INCLUDES COST OF TEMPORARILY BLOCKING THE ABUTMENT FOOTING UNTIL THE CONCRETE BACKFILL IN THE PILE VOIDS HAS OBTAINED THE REQUIRED STRENGTH.</p> <p>THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT WILL BE FOR EACH PRECAST ABUTMENT FOOTING (2 REQUIRED) FURNISHED AND PLACED.</p> <p>INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.</p> <p>INCLUDES ANY FLOWABLE MORTAR PLACED UNDER THE PRECAST ABUTMENT TO FILL VOIDS OR TO HELP SUPPORT THE ABUTMENT DURING PLACEMENT.</p>
10	2599-9999005	<p>INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING AND PLACING THE PRETENSIONED PRECAST DECK BEAMS. INCLUDES ABUTMENT BEARING MATERIAL, MATERIAL (1" DIA. TIE RODS, WASHERS, NUTS, ETC) NEEDED FOR THE TRANSVERSE ASSEMBLY OF THE PANELS AND GROUTING OF THE TIE RODS.</p> <p>INCLUDES 1.5 C.Y. OF GROUT FOR SHEAR KEYS BETWEEN PANELS.</p> <p>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.</p> <p>INCLUDES CUTTING OFF AND GROUTING OF LIFTING HOOPS.</p> <p>INCLUDES COATING THE ENDS OF THE BEAMS WITH CONCRETE SEALER.</p>
11	2599-9999005	<p>THIS ITEM INCLUDES ALL COSTS FOR FURNISHING AND PLACING THE PRECAST ABUTMENT BACKWALLS INCLUDING (FOUR BACKWALLS - 5.2 C.Y. OF STRUCTURAL CONCRETE (BRIDGE), 1181 LBS. REINFORCING STEEL), INCLUDES EPOXY GROUT AND SLAB DOWELS FOR THE BACKWALL.</p> <p>THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT WILL BE FOR EACH PRECAST ABUTMENT BACKWALL FURNISHED AND PLACED.</p>

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.

1/23/2009
 Signature _____ Date _____
 Printed or Typed Name **Stuart S. Nielsen**

My license renewal date is December 31, 2010

Pages or sheets covered by this seal: SHEETS V.1 THRU V.10

DESIGN FOR 0° SKEW

50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE

50'-0 SPAN

QUANTITIES

STA. 11+35.4 APRIL 2009

BUENA VISTA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 10 FILE NO. 30365 DESIGN NO. 109

GENERAL NOTES:

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 25' X 17'-7 SINGLE SPAN CONCRETE BRIDGE CONSTRUCTED IN 1936. NO KNOWN COPIES OF THE ORIGINAL PLAN EXIST. THE EXISTING BRIDGE SUPERSTRUCTURE CONSISTS OF A CONCRETE DECK. THE EXISTING SUBSTRUCTURE CONSISTS OF CONCRETE WINGS AND 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 BEAMS.

THE LUMP SUM BID FOR "REMOVAL OF EXISTING BRIDGE" SHALL INCLUDE THE REMOVAL OF THE EXISTING 25' X 17'-7 CONCRETE 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 HL-93 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.

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.

BUENA VISTA 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.

THE BRIDGE CONTRACTOR IS TO CLEAR AND/OR SHAPE THE CHANNEL WITHIN THE APPROXIMATE LIMITS OF THE RIPRAP AREAS AS SHOWN ON THE SITUATION PLAN.

NOTE:

THIS PLAN USES NON-STANDARD PILE HEAD SPIRALS. SEE DETAILS FOR ADDITIONAL INFORMATION.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5#1 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

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, 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, 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 LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, 2007.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5, $f'c = 3,500$ PSI.
PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEET.
PRECAST ABUTMENT FOOTING CONCRETE IN ACCORDANCE WITH SECTION 5, $f'c = 5,000$ PSI.

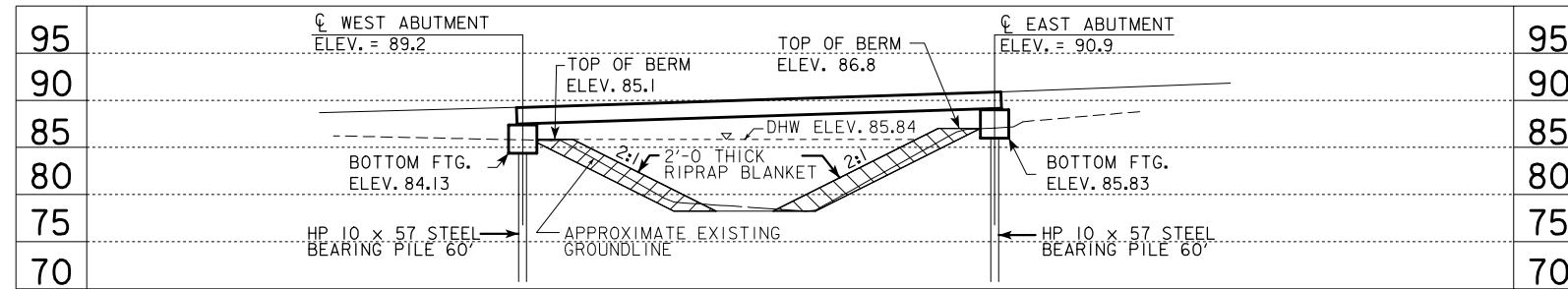
ROADWAY GRADING

NOTE: ALL ROAD GRADING TO BE PERFORMED BY BUENA VISTA COUNTY FORCES.

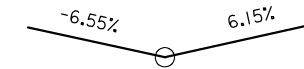
TRAFFIC CONTROL PLAN

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

DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
50'-0 SPAN
GENERAL NOTES
STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 10 FILE NO. 30365 DESIGN NO. 109



LONGITUDINAL SECTION ALONG CL ROADWAY

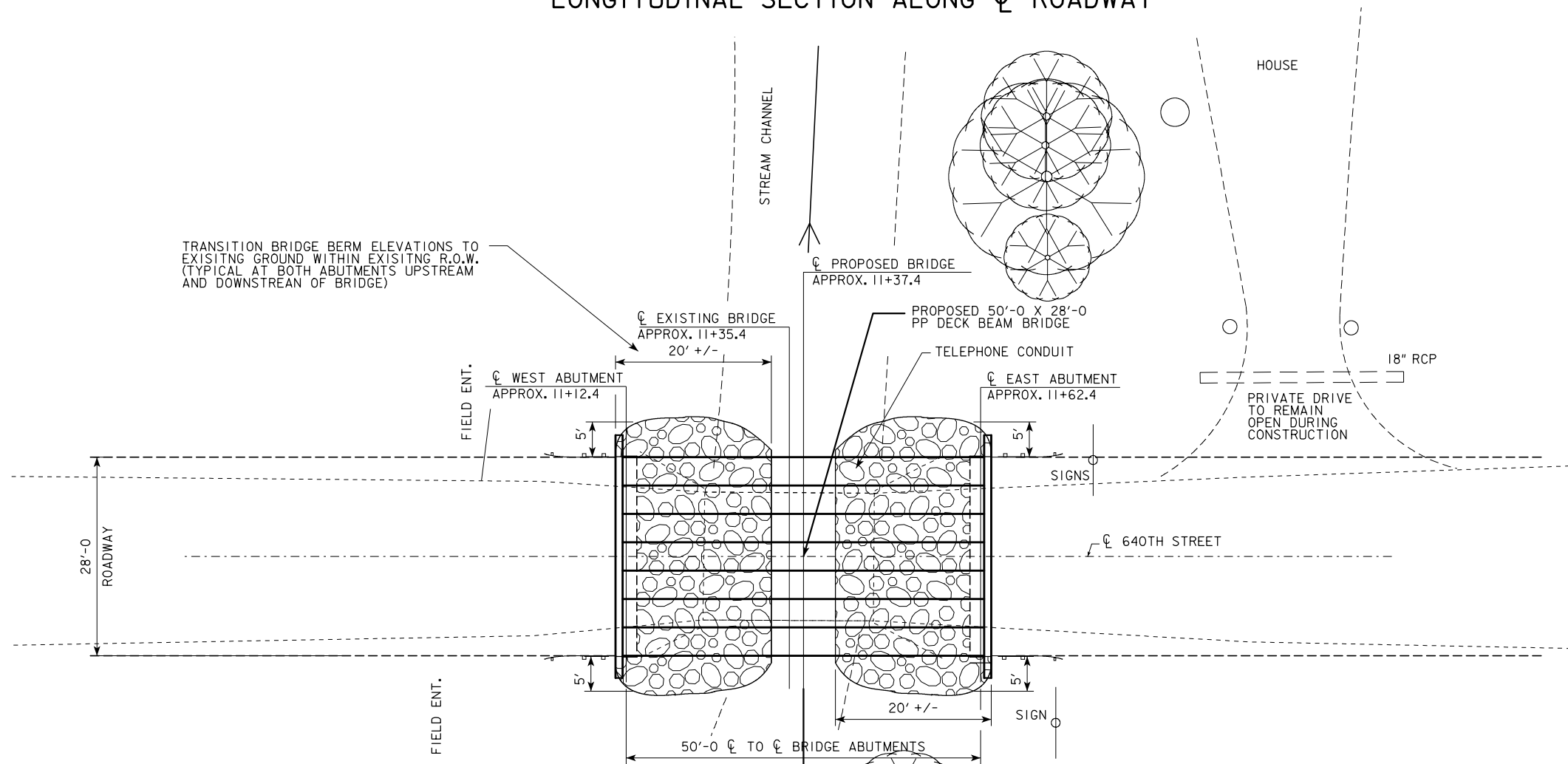


VPI STA = 9+75
VPI ELEV = 78'
VC = 600'
**PROPOSED PROFILE
GRADE 640TH STREET**

HYDRAULIC DATA

DRAINAGE AREA= 42.8 SQUARE MILES
Q₅₀= 1660 CFS
STAGE W/BACKWATER= 85.8
NATURAL STAGE AT BRIDGE= 84.8

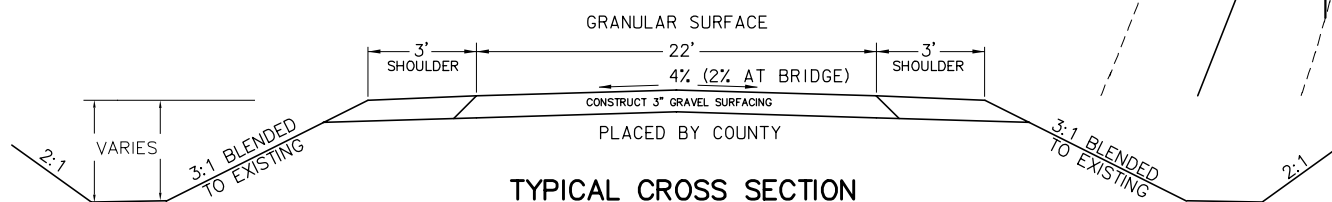
RIPRAP NOTE:
PLACE RIPRAP ON ENGINEERING FABRIC
ACCORDING TO THE IOWA DOT STANDARD
SPECIFICATIONS.



TRANSITION BRIDGE BERM ELEVATIONS TO EXISTING GROUND WITHIN EXISTING R.O.W. (TYPICAL AT BOTH ABUTMENTS UPSTREAM AND DOWNSTREAM OF BRIDGE)

LOCATION

640TH STREET OVER
BRANCH RACCOON RIVER
T-90 N R-36 W
SECTION NORTH SIDE 26
PROVIDENCE TOWNSHIP
BUENA VISTA COUNTY
EXISTING BRIDGE
FHWA #084510

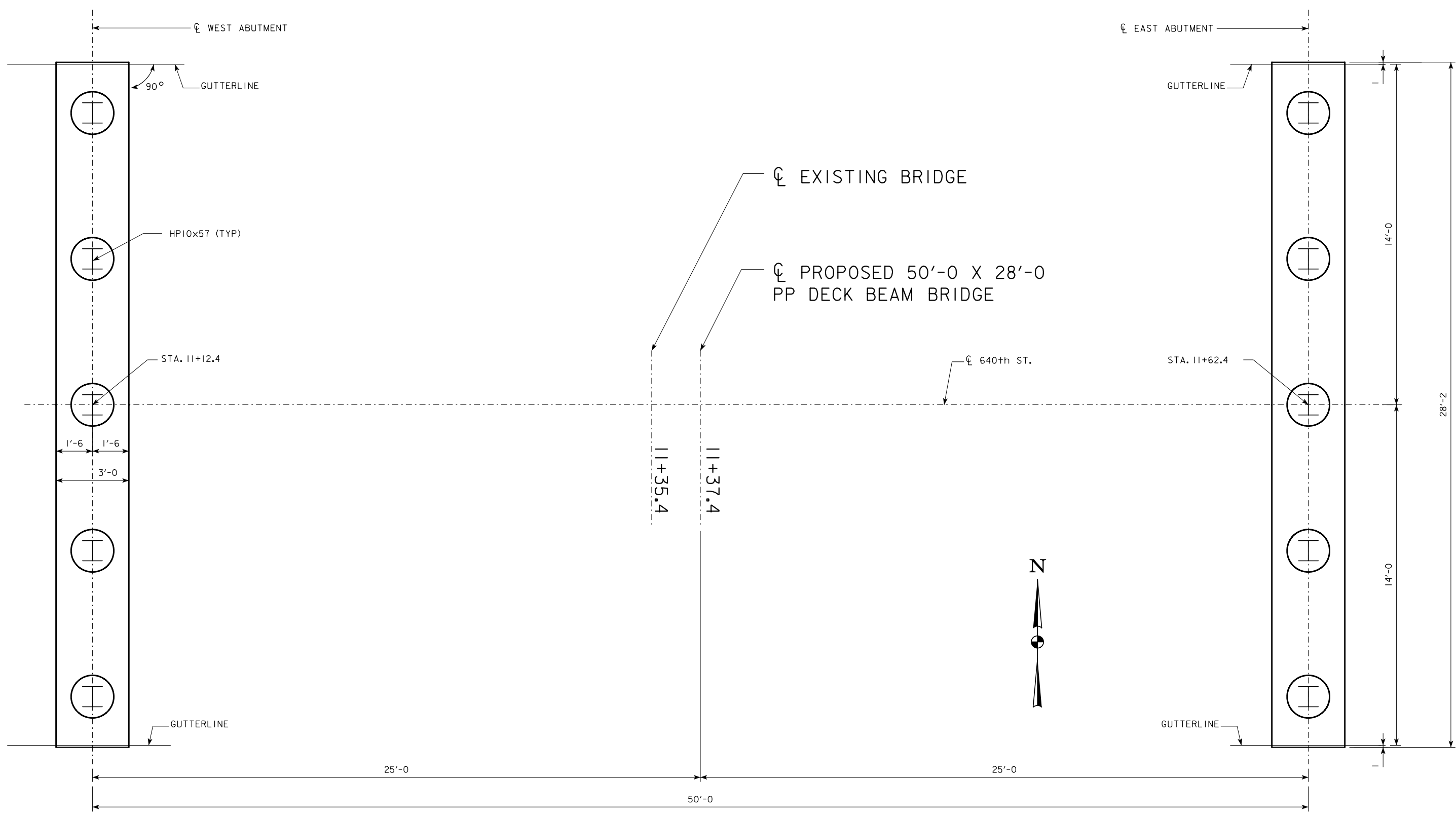


TYPICAL CROSS SECTION (NEAR BRIDGE)

SITUATION PLAN

DESIGN FOR 0° SKEW
**50'-0 X 28' PRECAST PRETENSIONED
DECK BEAM BRIDGE**
50'-0 SPAN
SITUATION PLAN
STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 10 FILE NO. 30365 DESIGN NO. 109





STAKING DIAGRAM

DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0 SPAN
STAKING DIAGRAM
 STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. **4** OF **10** FILE NO. **30365** DESIGN NO. **109**

REINFORCING BAR LIST

ONE PRECAST ABUTMENT FOOTING

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8f1	ABUTMENT FOOTING LONGITUDINAL - FACES	—	8	27'-8"	591
5f2	ABUTMENT FOOTING LONGITUDINAL - TOP	—	8	4'-0"	34
5p1	ABUTMENT HOOPS	□	56	9'-8"	565
8a2	MECHANICAL SPLICE FOR BACKWALL DOWELS	—	14	2'-8"	100
#2	PILE SPIRAL	WWW	10	33'-0"	55
	SPIRAL SPACER $L \frac{7}{8} \times \frac{7}{8} \times \frac{1}{8} \times 0.70$		30	1'-10"	39
	REINFORCING STEEL (LBS.)				1384

NOTE: THE 8a1 BARS ARE SPLICED TO THE 8a2 MECHANICAL SPLICERS IN THE ABUTMENT. MECHANICAL SPLICERS SHALL BE IN ACCORDANCE WITH MATERIALS IM 451, APPENDIX E.

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 47 TONS.

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 ONE WEEK PRIOR TO THE ERECTION FOR REVIEW AND APPROVAL.

THE STRUCTURAL CONCRETE USED TO FILL THE ABUTMENT PILING ENCASUREMENTS 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 $\frac{1}{2}$ " TOP SIZE.

OTHER MIXES MAY BE CONSIDERED PROVIDED 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 ENCASUREMENTS. 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.

ESTIMATED QUANTITIES ONE PRECAST ABUTMENT FOOTING

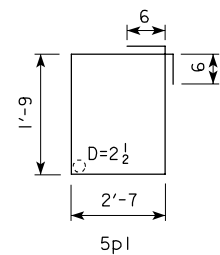
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE	CY	8.7
STRUCTURAL CONCRETE FOR PILE ENCASUREMENTS	CY	1.5
REINFORCING STEEL	LBS	1384
EXCAVATION CLASS 20	CY	36.0
21" ϕ CMP	LF	18.0

PILE QUANTITIES BOTH ABUTMENTS

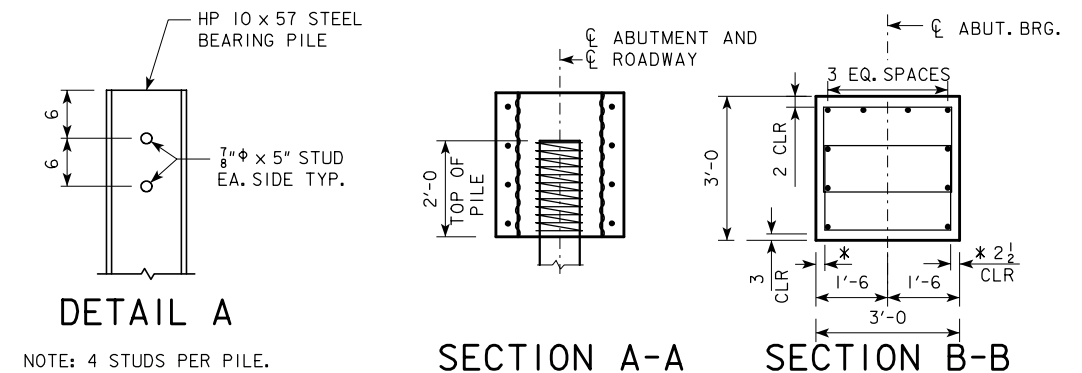
E. ABUT.	5 - HP10X57 @ 60'-0"	300'-0"
W. ABUT.	5 - HP10X57 @ 60'-0"	300'-0"
TOTAL		600'-0"

PRECAST ABUTMENT WEIGHT = 17.2 TONS

BENT BAR DETAILS

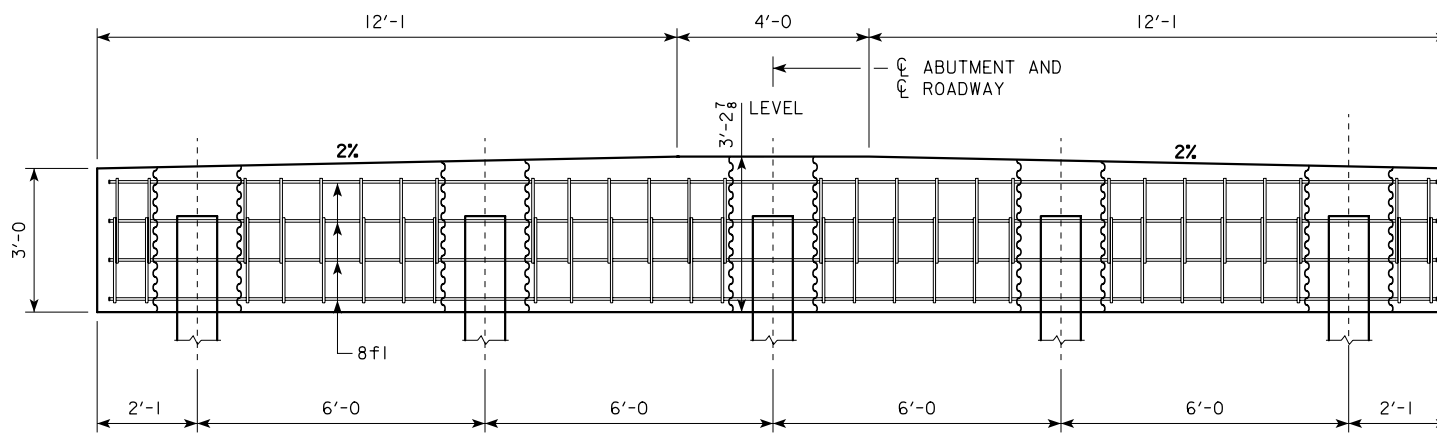


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D= PIN DIAMETER

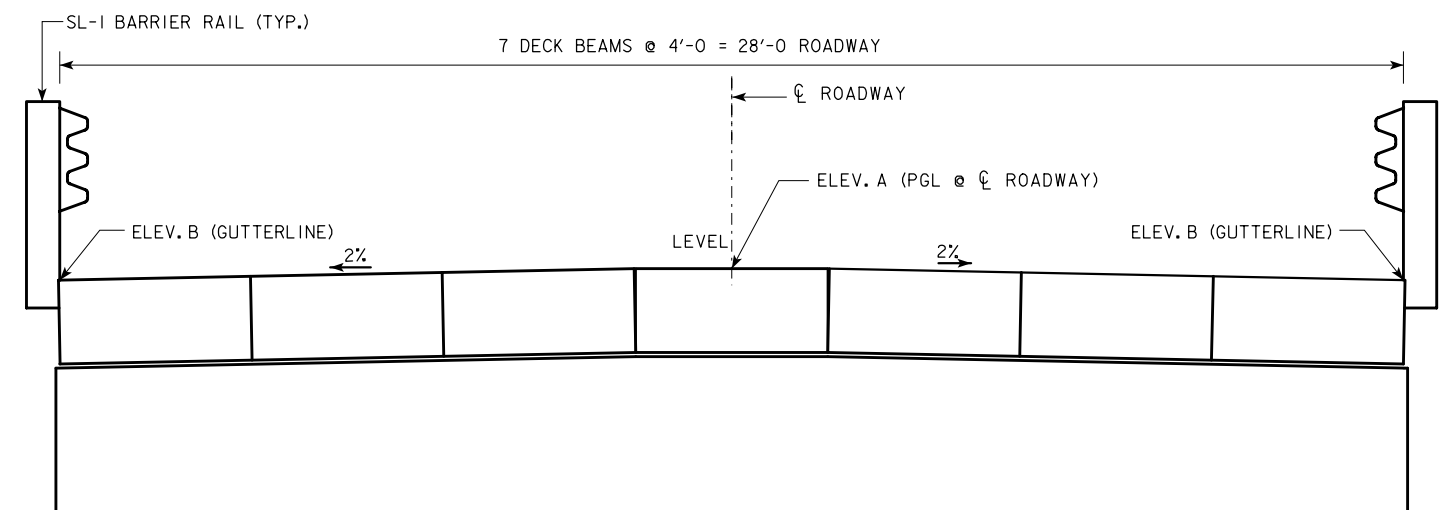


NOTE: 4 STUDS PER PILE.

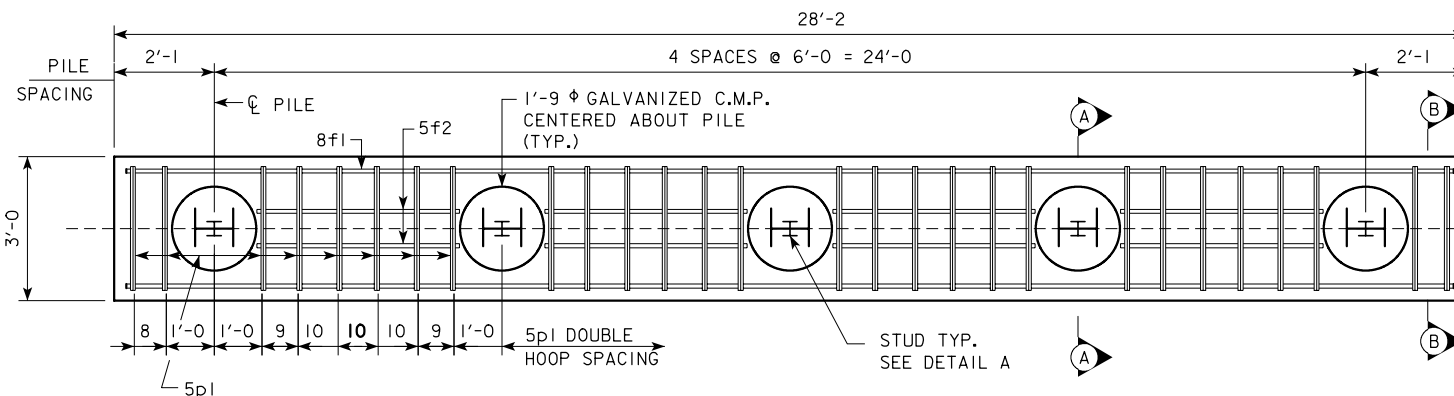
NOTE: THE SPIRAL AT THE TOP OF EACH PILE TO HAVE 7 TURNS OF NO. 2 BAR, 18" DIAMETER, 3" PITCH WITH 3 - $L \frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.



ABUTMENT ELEVATION



REAR ELEVATION AT ABUTMENT
(BACKWALL NOT SHOWN FOR CLARITY)



ABUTMENT PILE PLAN

ELEV.	W. ABUT.	E. ABUT.
A	89.20	90.90
B	88.96	90.66
BOTT. OF FOOTING	84.13	85.83

DESIGN FOR 0° SKEW
50'-0" X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0" SPAN
PRECAST ABUTMENT DETAILS
 STA. 11+35.4
BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 5 OF 10 FILE NO. 30365 DESIGN NO. 109

DOWEL SETTING NOTE:
 THE 8a1 BARS SHALL BE SET AS DOWELS IN PREFORMED HOLES. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE GROUT MANUFACTURER'S RECOMMENDATIONS. THE FOLLOWING SYSTEM MAY BE USED AS A BONDING AGENT FOR VERTICAL DOWELS:

A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

BACKWALL SETTING NOTE:

SET PRECAST BACKWALLS ON A EXPOXY GROUT BED TO HELP LEVEL AND CONNECT THE PRECAST ELEMENTS.

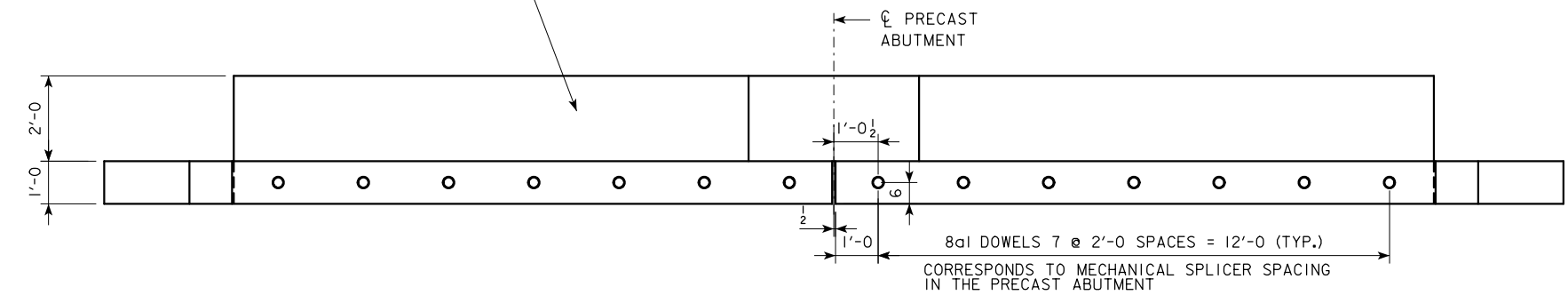
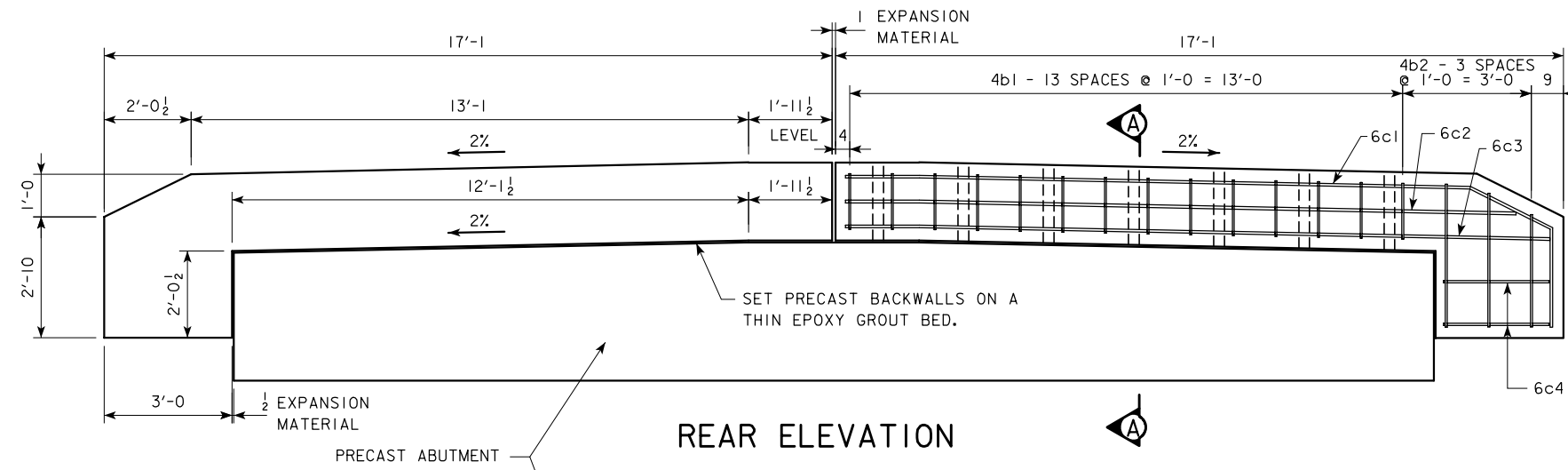
FOLLOW ALL MANUFACTURER RECOMMENDATIONS FOR INSTALLATION.

CARE SHOULD BE TAKEN TO AVOID SPILLS.

NOTE: THE 8a1 BARS ARE SPLICED WITH MECHANICAL SPLICERS TO THE ABUTMENT. MECHANICAL SPLICERS SHALL BE IN ACCORDANCE WITH MATERIALS IM 451, APPENDIX E.

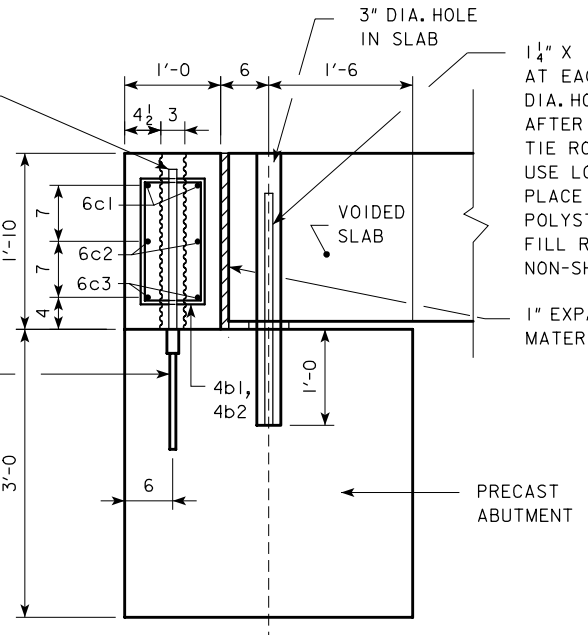
REINFORCING BAR LIST-FOUR BACKWALLS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4b1	BACKWALL, VERTICAL STIRRUPS		56	4'-8	175
4b2	BACKWALL, VERTICAL STIRRUPS		12	VARIES	65
6c1	BACKWALL, HORIZONTAL		8	19'-0	228
6c2	BACKWALL, HORIZONTAL		8	16'-0	192
6c3	BACKWALL, HORIZONTAL		8	16'-7	200
6c4	BACKWALL, HORIZONTAL		16	2'-8	64
8a1	THREADED (ONE END) BACKWALL DOWELS		28	1'-8	125
	1 1/4" DIAMETER SMOOTH SLAB DOWELS		14	2'-3	132
REINFORCING STEEL (LBS.)					1181

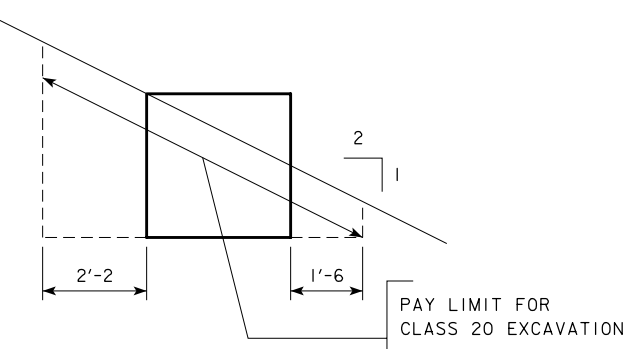


RECESSED 8a1 DOWELS, THREADED ON ONE END, CONNECTED TO A MECHANICAL SPLICER EMBEDDED IN THE PRECAST ABUTMENT.

USE 3" DIAMETER RIGID PLASTIC CORRUGATED TUBES TO PROVIDE THE OPENINGS FOR THE DOWELS. COVER DOWELS WITH 2" OF GROUT.



1 1/4" X 2'-3" SMOOTH DOWELS (A36) AT EACH END OF SLAB. DRILL A 1 1/2" DIA. HOLE 12" DEEP INTO ABUTMENT AFTER BEAMS ARE IN PLACE AND TIE RODS HAVE BEEN TIGHTENED. USE LOW IMPACT ROTARY DRILL. PLACE 2" DIA X 1" THICK POLYSTYRENE PLUG ON TOP OF DOWEL. FILL REMAINDER OF HOLE WITH NON-SHRINK GROUT.



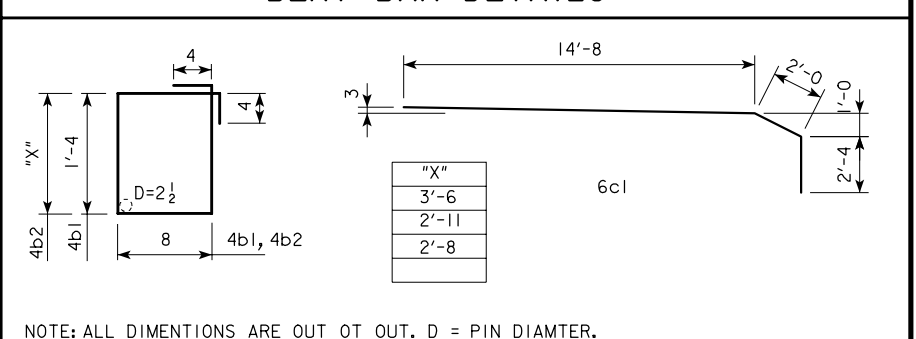
BACKWALL CONCRETE QUANTITIES

SECTION	TOTAL
BACKWALL (4 @ 1.3)	5.2
TOTAL (C.Y.)	5.2

NOTE:
 THE PRECAST BACKWALLS SHALL BE DRY FITTED TO THE PRECAST ABUTMENTS IN THE PRECASTER'S YARD OR SHOP BEFORE SHIPPING THE PIECES TO THE FIELD.

THE ENGINEER SHALL HAVE 48 HOURS NOTICE TO VIEW AND APPROVE THE CONNECTED PRECAST PIECES BEFORE THEY ARE SHIPPED TO THE FIELD.

BENT BAR DETAILS



NOTE: ALL DIMENTIONS ARE OUT OT OUT. D = PIN DIAMTER.

DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0 SPAN
ABUTMENT BACKWALL
 STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 6 OF 10 FILE NO. 30365 DESIGN NO. 109

BEAM NOTES:

THESE BEAMS ARE DESIGNED FOR HL-93 LOADING, PLUS 50 LBS. PER SQUARE FOOT FOR A FUTURE WEARING SURFACE.

ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.

THE TOTAL INITIAL PRESTRESS FOR THE DECK BEAMS IS BASED ON 72.664% $f's$. $f's = 270$ ksi AND $A_s = 0.153$ SQ. IN.. THE MINIMUM STRAND BREAKING STRENGTH SHALL BE 41.3 KIPS.

THE RELEASE AND FINAL CONCRETE STRENGTHS SHALL BE A MINIMUM OF $f'ci = 6$ ksi AT AT RELEASE AND $f'c = 7$ KSI AT 28 DAYS.

WHEN A TIGHT, UNIFORM SURFACE HAS BEEN ACHIEVED, THE BEAM SURFACES 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 $\frac{1}{8}'' \pm$ IN WIDTH. THE DEPTH OF THE GROOVE IN THE PLASTIC CONCRETE SHALL BE $\frac{1}{8}''$ AS A TARGET WITH A $\pm \frac{1}{16}''$ TOLERANCE. GROOVING SHALL BE TRANSVERSE TO THE CENTERLINE OF THE ROADWAY. TRANSVERSE GROOVING SHALL BE RANDOMLY SPACED FROM $\frac{3}{4}''$ INCH TO $1\frac{3}{8}''$ INCHES WITH NO MORE THAN 50% OF THE SPACINGS EXCEEDING $1\frac{1}{4}''$ 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 BEAMS 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 THE STANDARD SPECIFICATIONS.

BEARINGS SHALL BE AS DETAILED ON THIS SHEET. 70 DUROMETER NEOPRENE SHALL BE USED FOR THE BEARING PADS. THE COST OF THE NEOPRENE PADS SHALL BE INCLUDED IN THE PRICE BID FOR PRETENSIONED PRECAST 48" X 21" DECK BEAM.

LIFTING LOOPS LOCATIONS SHALL BE DESIGNED BY THE PRECAST MANUFACTURER AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION OF THE BEAMS. ONCE IN PLACE THE LIFTING LOOPS SHALL BE CUT OFF 2" INCHES BELOW THE TOP SURFACE OF THE PRECAST BEAMS AND THE RECESSED AREA SHALL BE GROUTED WITH A GROUT MATERIAL APPROVED BY THE ENGINEER.

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

THE 1" ϕ THREADED GALVANIZED RODS SHALL BE IN ACCORDANCE WITH ASTM A 307-04, GRADE A. THE STRUCTURAL STEEL FOR THE $\frac{5}{8}''$ PLATE WASHERS SHALL BE IN ACCORDANCE WITH ASTM A 709, GRADE 50. THE HEX NUTS FOR THE 1" ϕ THREADED RODS SHALL BE IN ACCORDANCE WITH ASTM A 563, GRADE A. THE HEX COUPLING NUTS SHALL BE IN ACCORDANCE WITH STANDARD IF1-128 2000 UNDER ANSI/ASME B18.22.

IF NECESSARY, BEARING SEAT SURFACES SHALL BE ADJUSTED BY SHIMMING TO ASSURE FIRM AND EVEN BEARING OF THE DECK BEAMS. TWO $\frac{1}{8}''$ NEOPRENE ADJUSTING SHIMS WITH THE DIMENSIONS OF THE EXTERIOR BEARING PAD SHALL BE PROVIDED FOR EACH BEARING. THE COST OF SHIMS SHALL BE INCLUDED IN THE PRICE BID FOR PRETENSIONED PRECAST 48" X 21" DECK BEAM.

BEAM 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.

CONCRETE SEALER SHALL BE APPLIED TO THE PRESTRESSED DECK BEAM ENDS IN ACCORDANCE WITH STANDARD SPECIFICATION 2403.21 D.

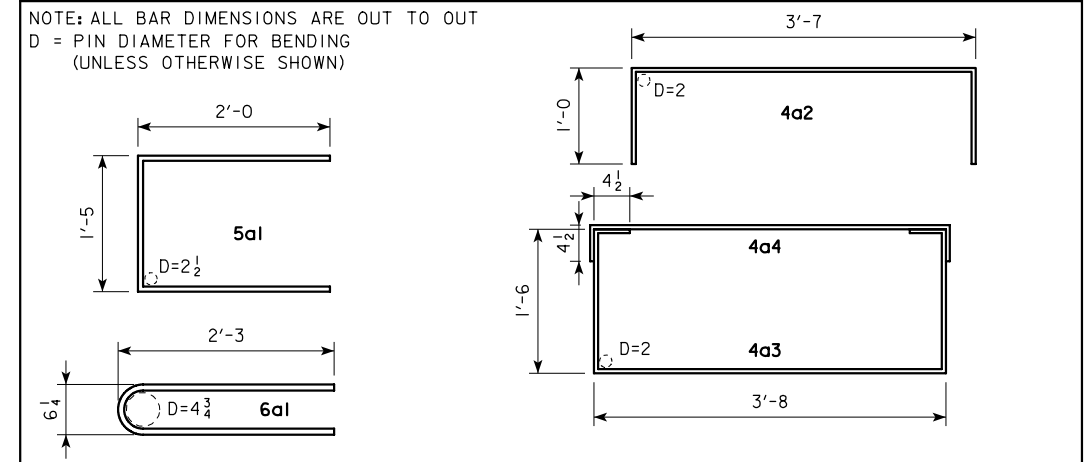
NOTE:
THE 4a1 BARS CAN BE DIVIDED INTO TWO PIECES WITH A 1'- 8 SPLICE, FOR EASE OF CONSTRUCTION.

REINFORCING BAR LIST - ONE BEAM

BAR	SHAPE	NO.	LENGTH	WEIGHT
4a1		8	50'-6	270
4a2		4	5'-7	15
4a3		63	7'-5	313
4a4		63	4'-5	186
5a1		8	5'-5	45
6a1		2	5'-0	15
TOTAL WT. (LBS.)				844

BENT BAR DETAILS

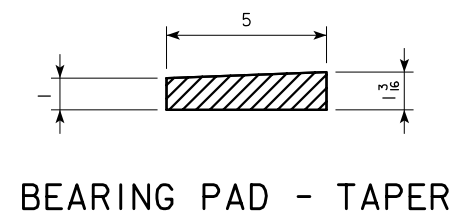
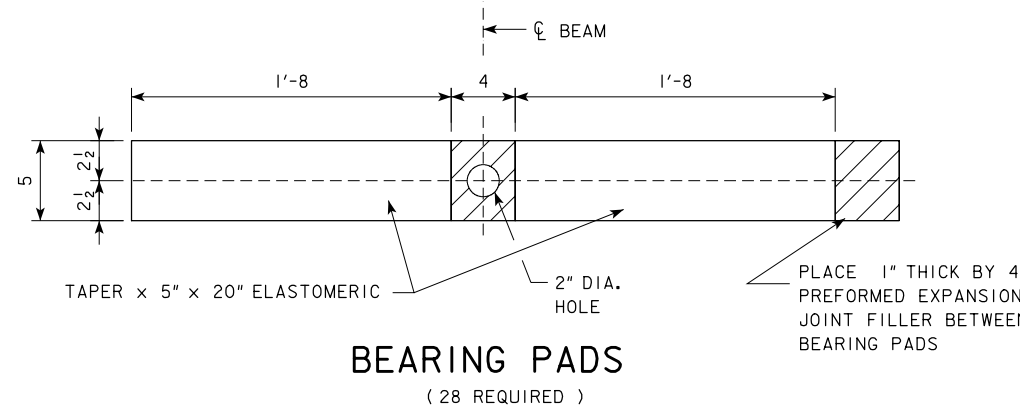
NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT
D = PIN DIAMETER FOR BENDING
(UNLESS OTHERWISE SHOWN)



AREA = 695 in²
 $\bar{y}_b = 10.3$ in.
I = 34,517 in⁴
S_b = 3,287 in³
S_t = 3,287 in³

BEAM SECTION PROPERTIES

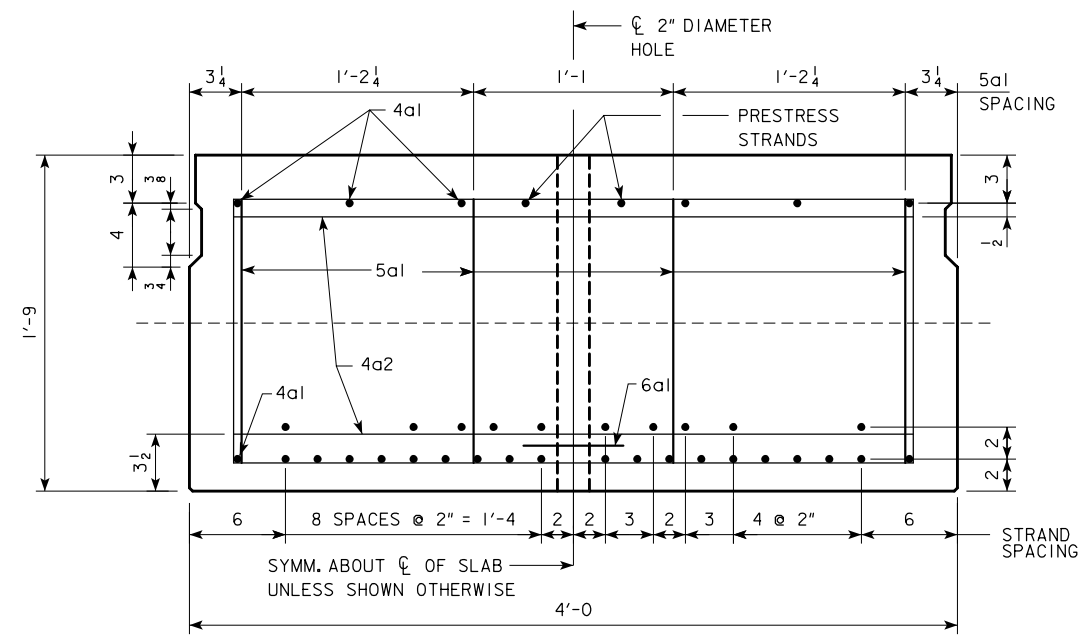
NOTE:
CUT STRANDS FLUSH WITH THE END OF THE BEAM



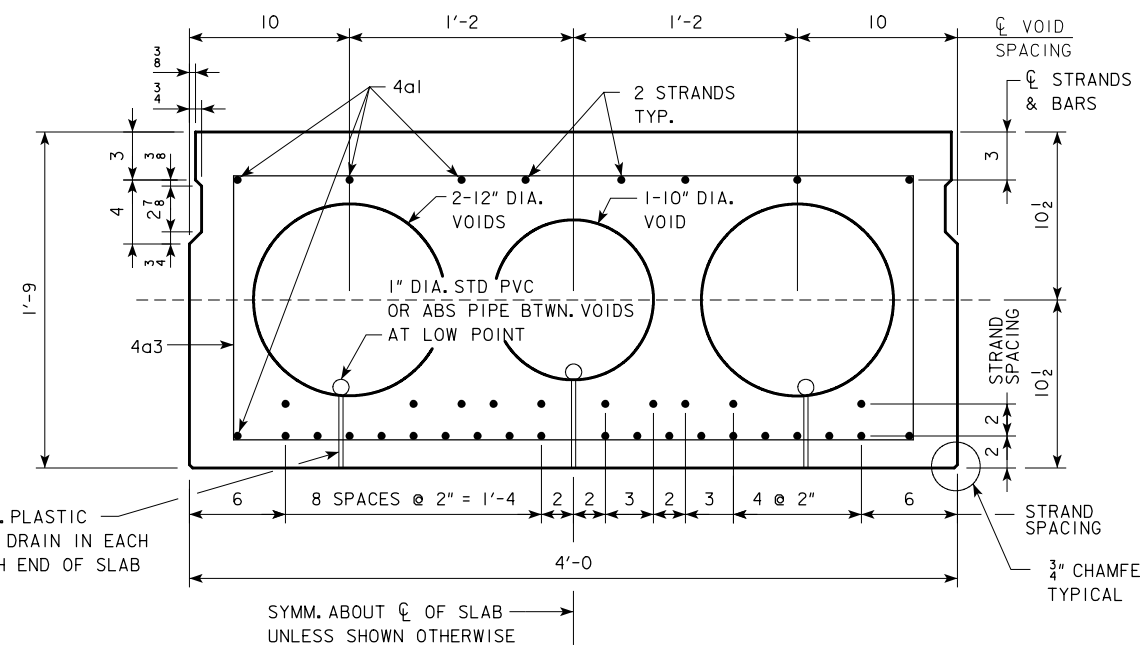
DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
50'-0 SPAN
DECK BEAM DETAILS
STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 7 OF 10 FILE NO. 30365 DESIGN NO. 109

PRETENSIONED PRECAST 48" X 21" DECK BEAMS

21" SLAB	SPAN LENGTH CL-BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH		STRAND SIZE DIA. (in)	NO. OF STRAND		TOTAL INITIAL PRESTRESS kips	CAMBER (in)		WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (WEIGHT-LBS)
			f'ci (ksi)	f'c (ksi)		STRAIGHT	DEFLECTED		AT RELEASE	AFTER LOSSES			
21" SLAB	50'-0"	50'-10"	6.0	7.0	0.5	30	0	900.5	1.2	1.0	19	9.1	844



SECTION AT CL BEARING

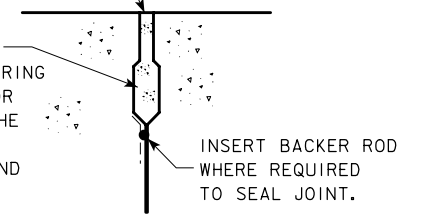


SECTION AT MIDSPAN

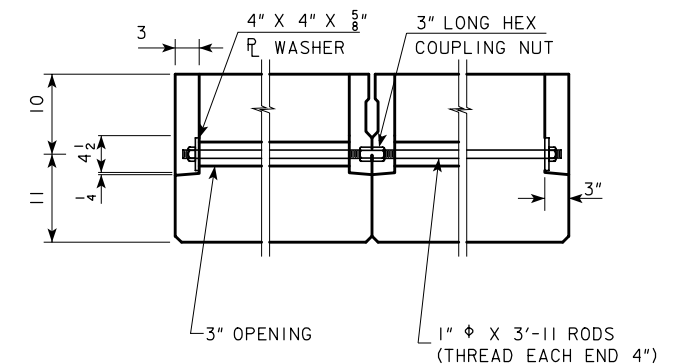
1" INSIDE DIA. PLASTIC FORMED VOID DRAIN IN EACH VOID AT EACH END OF SLAB

FILL KEYWAY TO TOP WITH GROUT.

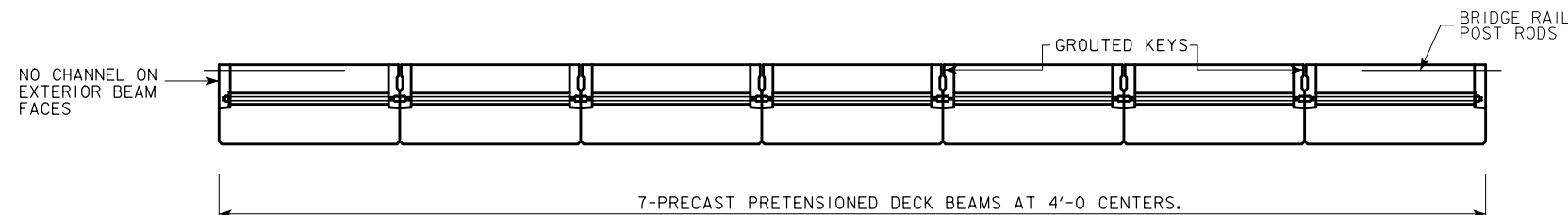
KEYWAY GROUT. KEEP KEYWAYS MOIST PRIOR TO PLACING GROUT. AFTER POURING GROUT, WATER CURE KEYWAY GROUT FOR THE PERIOD OF TIME INDICATED BY THE MANUFACTURER. GROUT KEYWAYS, TIE ROD OPENINGS AND LIFTING STRAND POCKETS.



KEYWAY GROUT

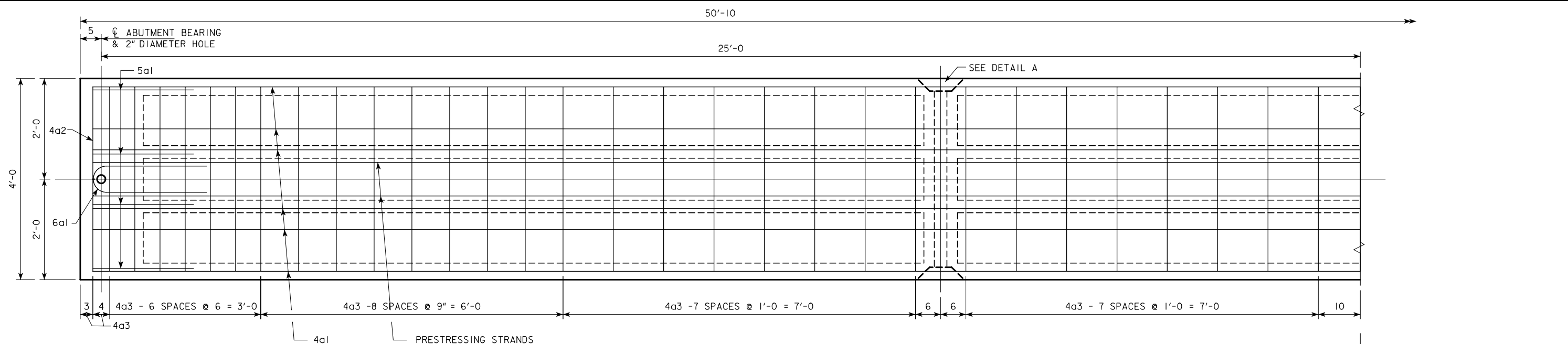


TRANSVERSE TIE ASSEMBLY



DECK BEAM ASSEMBLY

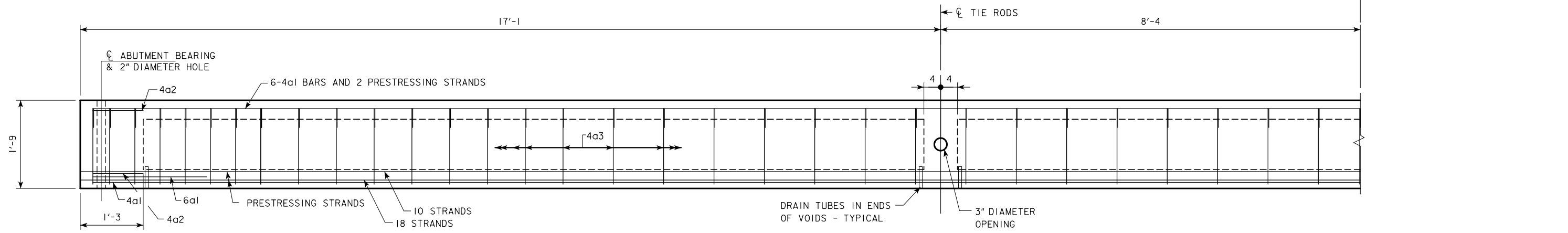
DESIGN FOR 0° SKEW
50'-0" X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0" SPAN
DECK BEAM DETAILS
 STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
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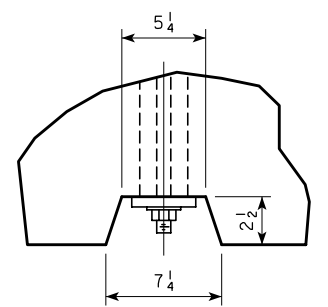
DECK BEAM DETAILS - PLAN VIEW

(NOTE: BOTTOM PRESTRESSING STRANDS NOT SHOWN FOR CLARITY)

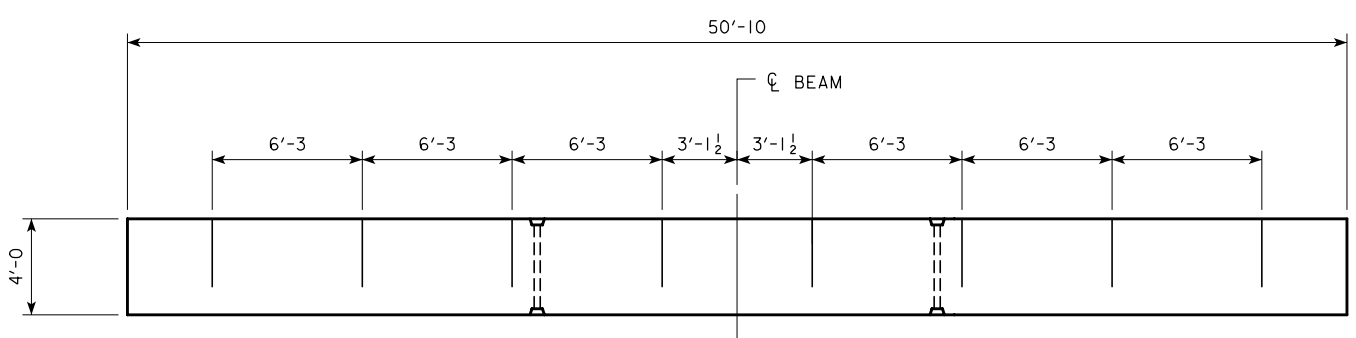
SYMM. ABOUT ϕ OF SLAB
UNLESS SHOWN OTHERWISE



DECK BEAM DETAILS - ELEVATION VIEW

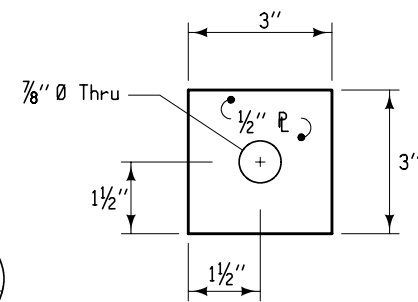
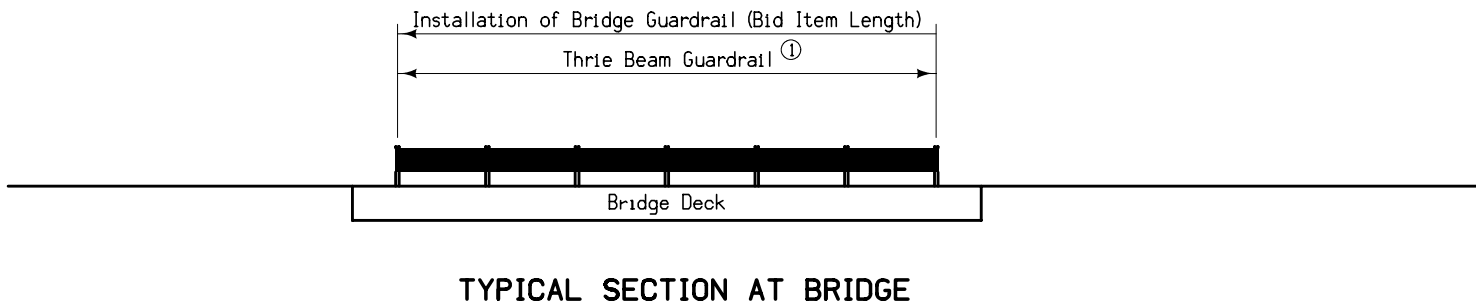
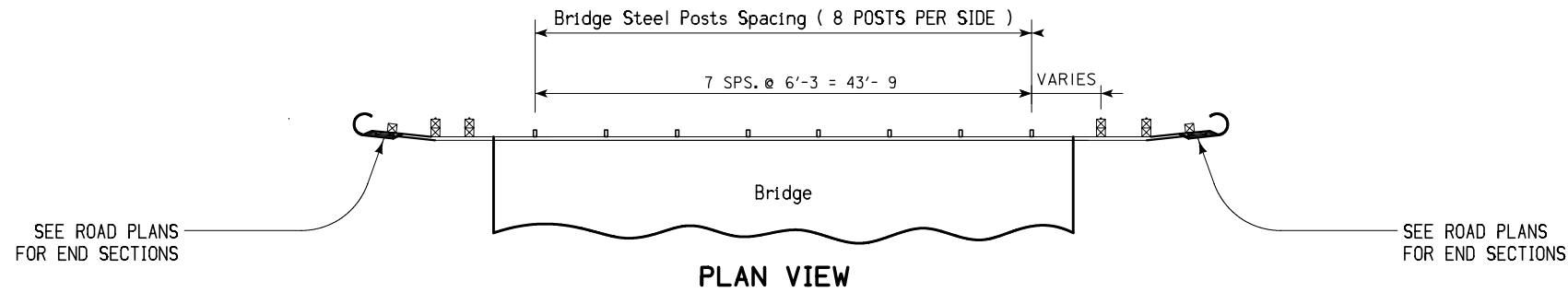


DETAIL A

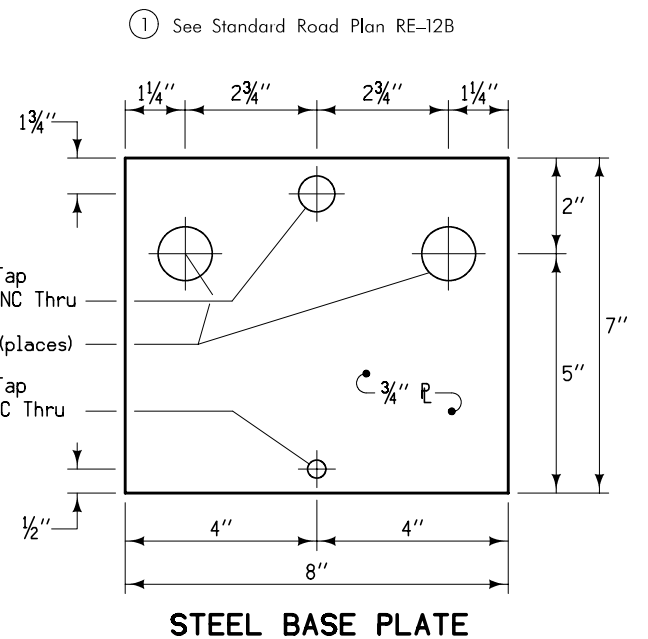


RAILING TIE BAR SPACING - PLAN VIEW

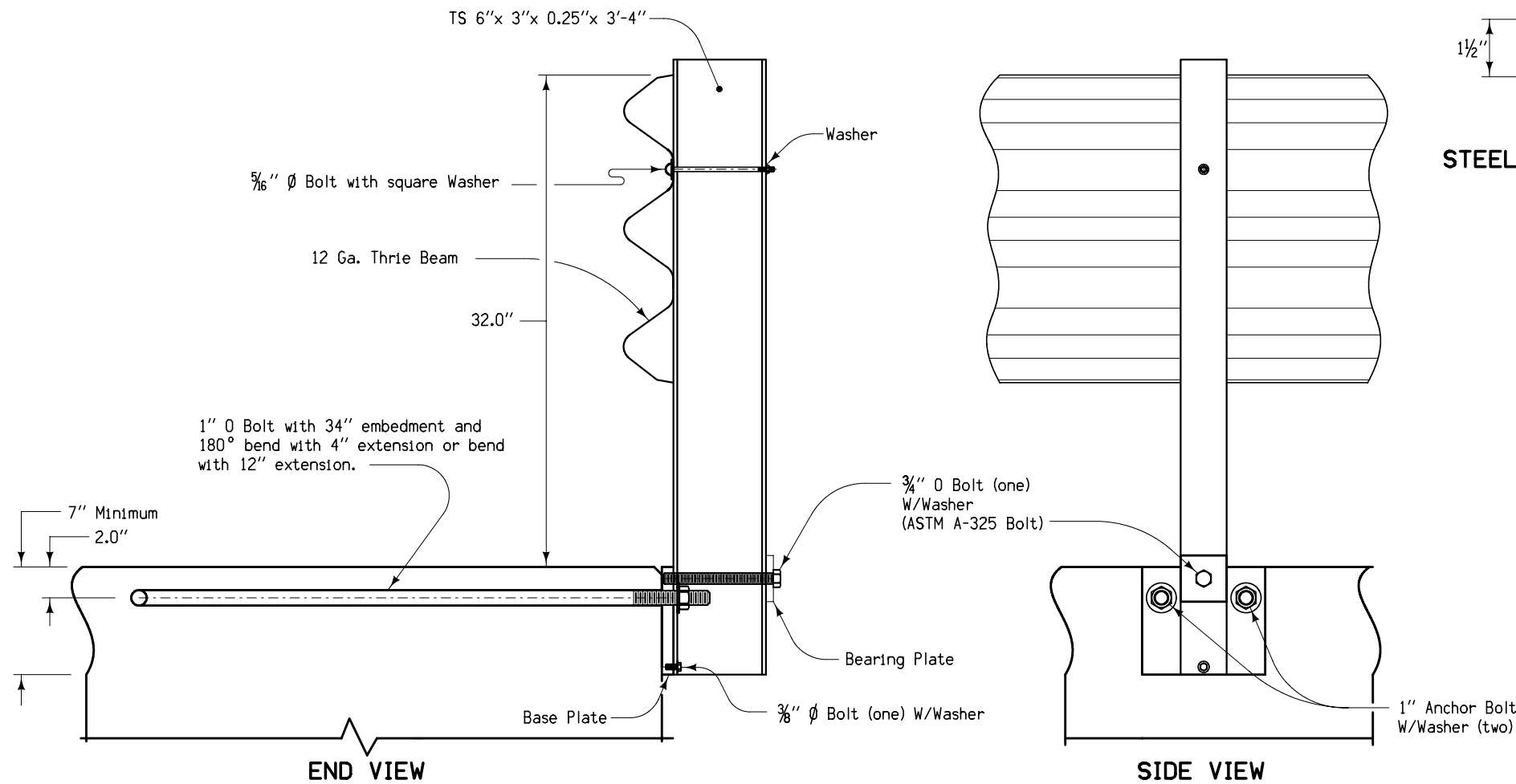
DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0 SPAN
DECK BEAM DETAILS
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BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 9 OF 10 FILE NO. 30365 DESIGN NO. 109



STEEL BEARING PLATE



STEEL BASE PLATE



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 Bridge Guardrail in linear Feet

DESIGN FOR 0° SKEW
50'-0 X 28' PRECAST PRETENSIONED DECK BEAM BRIDGE
 50'-0 SPAN
SERVICE LEVEL I BRIDGE RAIL DETAILS
 STA. 11+35.4 APRIL 2009
BUENA VISTA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 10 OF 10 FILE NO. 30365 DESIGN NO. 109