

BRIDGE REPLACEMENT-PPCB  
IM-NHS-035-4(194)94--03-77

**LEGEND**

INTERSTATE HIGHWAY	
PRIMARY HIGHWAY-DIVIDED	
PRIMARY HIGHWAY	
PORTLAND CEMENT CONCRETE ROAD	
ASPHALT ROAD	
BITUMINOUS ROAD	
GRAVEL ROAD	
EARTHEN ROAD	
INTERSTATE HIGHWAY	
UNITED STATES HIGHWAY	
STATE HIGHWAY	
COUNTY HIGHWAY	
RAILROAD	
PIPELINE	
AIRPORT	
HYDROLOGY	
BRIDGE	
STATE BOUNDARY	
COUNTY BOUNDARY	
CORPORATE BOUNDARY	
TOWNSHIP LINE	
SECTION LINE	
ROAD NAMES	
UNINCORPORATED PLACE	



PLANS OF PROPOSED IMPROVEMENTS ON THE  
**INTERSTATE ROAD SYSTEM**  
POLK COUNTY

**BRIDGE REPLACEMENT - PPCB**  
**IN ANKENY OVER FOURMILE CREEK (MEDIAN & NB)**

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

TOTAL SHEETS	95
PROJECT NUMBER	IM-NHS-035-4(194)94--03-77
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	04-77-035-030-01

**INDEX OF SHEETS**

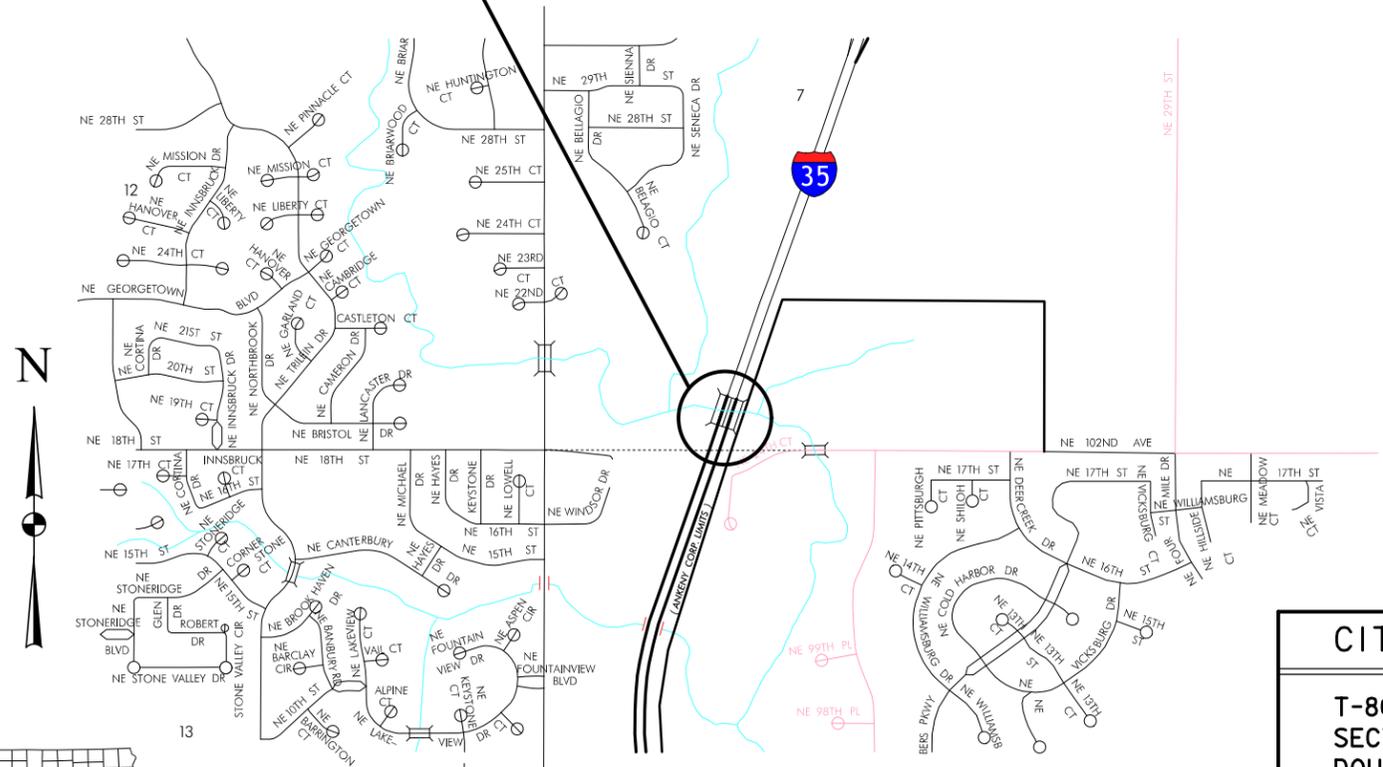
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 1018
2-30	DESIGN 1018
31	ESTIMATE SHEET - DESIGN 1118
31-66	DESIGN 1118
SPS.1-SPS.3	SOIL PROFILE SHEETS
C.1	ESTIMATED ROADWAY QUANTITIES
A.1-L.3	ROADWAY SHEETS

REVISIONS

--	--

**IOWA ONE CALL**  
1-800-292-8989  
www.iowaonecall.com

DESIGN NO. 1018 & 1118



LOCATION MAP

PROJECT DIRECTORY NAME: 7703503004

**STANDARD ROAD PLANS**  
STANDARD ROAD PLANS ARE LISTED ON SHEET NUMBER C.1

**DESIGN DATA URBAN**  
REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION.

**INDEX OF SEALS**

SHEET NO.	NAME	TYPE
I	Mark C. Currie	Structural Design
* SPS.1	Matthew D. Cushman	Geotechnical Design
** A.1	Scott E. Port	Roadway Design

\* Provided by Terracon Consultants Inc.  
\*\* Provided by Snyder & Associates Inc.

**CITY MAP NOT TO SCALE**  
T-80N R-23W  
SECTIONS 7  
DOUGLAS TWP.  
PART OF CITY OF ANKENY

**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.

Signature: Date: 04-17-2017  
Printed or Typed Name: **MARK C. CURRIE**

My license renewal date is December 31, 2017

Pages or sheets covered by this seal: SHEETS I THRU 66, EXCLUDING HYDRAULIC DESIGN

POLK COUNTY - DESIGN NO. 1018 & 1118

**ESTIMATED BRIDGE QUANTITIES - DESIGN NO. 1018**

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	458.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	302	
3	2402-2721000	EXCAVATION, CLASS 21	CY	470	
4	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	315.6	
5	2403-7000210	HIGH PERFORMANCE STRUCTURAL CONCRETE	CY	218.8	
6	2404-7775000	REINFORCING STEEL	LB	36,851	
7	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	59,358	
8	2404-7775009	REINFORCING STEEL, STAINLESS STEEL	LB	6740	
9	2407-0562840	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB40	EACH	4	
10	2407-0562860	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB60	EACH	4	
11	2407-0562890	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB90	EACH	4	
12	2408-7800000	STRUCTURAL STEEL	LB	9430	
13	2501-0201057	PILES, STEEL, HP 10 X 57	LF	4650	
14	2501-6335010	PREBORED HOLES	LF	120	
15	2501-8400172	TEMPORARY SHORING	LS	1.00	
16	2507-3250005	ENGINEERING FABRIC	SY	670.0	
17	2507-6800061	REVTMENT, CLASS E	TON	730.0	
18	2526-8285000	CONSTRUCTION SURVEY	LS	1.00	
19	2533-4980005	MOBILIZATION	LS	1.00	
20	2599-9999010	VIBRATION MONITORING	LS	1.00	

**ESTIMATE REFERENCE INFORMATION - DESIGN NO. 1018**

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL CONSISTS OF EXCAVATION REQUIRED TO EMBED THE REVETMENT, ENGINEERING FABRIC, AND CLASS E RIPRAP. SEE DESIGN SHEET 5 FOR QUANTITY ITEMIZATION.
2	2402-2720000	EXCAVATION, CLASS 20 --
3	2402-2721000	EXCAVATION, CLASS 21 --
4	2403-0100010	STRUCTURAL CONCRETE (BRIDGE) INCLUDES ALL RESILIENT JOINT FILLER REQUIRED. INCLUDES FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), FLOODABLE BACKFILL, POROUS BACKFILL, GEOTEXTILE FABRIC, WATER FLOODING, AND SUBDRAIN OUTLET AT ABUTMENTS AND TOE OF BERM.
5	2403-7000210	HIGH PERFORMANCE STRUCTURAL CONCRETE THIS BID ITEM INCLUDES THE CONCRETE FOR THE DECK, ABUTMENT DIAPHRAGMS, AND PIER DIAPHRAGMS. REFER TO THE DEVELOPMENTAL SPECIFICATION FOR "HIGH PERFORMANCE CONCRETE FOR STRUCTURES" FOR ADDITIONAL INFORMATION.
6	2404-7775000	REINFORCING STEEL INCLUDES COST OF MECHANICAL SPLICE ASSEMBLIES IN THE PIERS. PART B OF THE MECHANICAL SPLICE ASSEMBLIES TO BE INSTALLED IN DESIGN 1218 SHALL BE STORED BY THE ENGINEER UNTIL DESIGN 1218 IS AWARDED. SEE GENERAL NOTES SHEET FOR ADDITIONAL NOTES.
7	2404-7775005	REINFORCING STEEL, EPOXY COATED INCLUDES COST OF MECHANICAL SPLICE ASSEMBLIES IN THE DECK, ABUTMENT, AND PIER DIAPHRAGMS. PART B OF THE MECHANICAL SPLICE ASSEMBLIES TO BE INSTALLED IN DESIGN 1218 SHALL BE STORED BY THE ENGINEER UNTIL DESIGN 1218 IS AWARDED. SEE GENERAL NOTES SHEET FOR ADDITIONAL NOTES.
8	2404-7775009	REINFORCING STEEL, STAINLESS STEEL --
9	2407-0562840	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB40 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.

**ESTIMATE REFERENCE INFORMATION - DESIGN NO. 1018**

ITEM NO.	ITEM CODE	DESCRIPTION
10	2407-0562860	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB60 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.
11	2407-0562890	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB90 INCLUDES PIER BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.
12	2408-7800000	STRUCTURAL STEEL INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING INTERMEDIATE STEEL DIAPHRAGMS. INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING DECK EDGE ARMORING.
13	2501-0201057	PILES, STEEL, HP 10 X 57 INCLUDES PILE UPLIFT ANCHORS. SEE DETAILS ON DESIGN SHEETS 8 & 10.
14	2501-6335010	PREBORED HOLES --
15	2501-8400172	TEMPORARY SHORING INCLUDES THE COST TO FURNISH AND INSTALL SHEETING AND SHORING AS REQUIRED TO FACILITATE CONSTRUCTION OF THE ABUTMENT WITHOUT LOSS OF SUPPORT OF THE ADJACENT AT-GRADE PAVEMENT. SHEETING IS TO BE LEFT IN PLACE AND PULLED AS PART OF A FUTURE CONTRACT.
16	2507-3250005	ENGINEERING FABRIC SEE DESIGN SHEET 5 FOR DETAILS AND QUANTITY ITEMIZATION. ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
17	2507-6800061	REVTMENT, CLASS E SEE DESIGN SHEET 5 FOR DETAILS AND QUANTITY ITEMIZATION. ESTIMATED AT 1.6 TON/CY.
18	2526-8285000	CONSTRUCTION SURVEY --
19	2533-4980005	MOBILIZATION --
20	2599-9999010	VIBRATION MONITORING REFER TO THE SPECIAL PROVISIONS FOR "VIBRATION MONITORING" FOR ADDITIONAL INFORMATION.

NOTE:  
ROADWAY QUANTITIES SHOWN  
ON SHEET C.I IN THESE PLANS.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS                      92'-0 INTERIOR SPAN  
**ESTIMATED BRIDGE QUANTITIES**  
 STATION 329+91.45                      (STAGE A)                      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO.   1   OF  29  FILE NO.  30541  DESIGN NO.  1018



**SPECIFICATIONS:**

DESIGN: AASHTO LRFD 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.  
 CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT, INCLUDING: DEVELOPMENTAL SPECIFICATIONS FOR HIGH PERFORMANCE CONCRETE FOR STRUCTURES, SPECIAL PROVISIONS FOR VIBRATION MONITORING.

**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.  
 REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI, EXCEPT PRESTRESSED BEAM CONCRETE AS NOTED.  
 PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEET 23 THRU 26. BRIDGE DECK CONCRETE f'c = 4.0 KSI.  
 STRUCTURAL STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 6. ASTM A709 GRADE 36 AND GRADE 50 (AASHTO M270 GRADE 36 AND GRADE 50).

**GENERAL NOTES:**

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT NEW DUAL 194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES WITH A 15° R.A. SKEW, ON THE ALIGNMENT OF I-35 CONSTRUCTION OVER FOURMILE CREEK, WHICH IS STAGE A OF THE DUAL BRIDGE PROJECT (STAGE A OF THE DUAL BRIDGE PROJECT CORRESPONDS TO STAGES 1, 2A AND 2B OF THE ROADWAY PROJECT IM-NHS-035-4(140)92--03-77); STAGE B WILL BE COMPLETED UNDER A SEPARATE DESIGN (POLK COUNTY DESIGN 1118), AND STAGE C AND THE FINAL STAGE WILL BE COMPLETED UNDER A FUTURE SEPARATE DESIGN (POLK 1218). THE FINAL CONFIGURATION WILL BE DUAL 194'-0 x 75'-4 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES.

THE CITY AND 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 CONSTRUCTION STARTING DATE.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. 1062).

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

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

REFER TO ROADWAY PLANS FOR TEMPORARY BARRIER DETAILS AND LOCATIONS.

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.

CLASS 20 EXCAVATION QUANTITIES ARE BASED ON THE ASSUMPTION THAT THE CLASS 10 ROADWAY WORK IS COMPLETED PRIOR TO STARTING CONSTRUCTION OF THE ABUTMENTS AND PIERS.

THE APPROACH FILLS AS SHOWN ARE INCLUDED IN THE GRADING PLANS FOR THE PROJECT IM-NHS-035-4(140)92--03-77 AND ARE TO BE IN PLACE BEFORE ABUTMENT PILES ARE DRIVEN. THE BRIDGE CONTRACTOR IS TO LEVEL OFF AND SHAPE THE BERMS TO THE ELEVATIONS AND DIMENSIONS SHOWN. DRESSING OF SLOPES OUTSIDE THE BRIDGE AREA NOT DISTURBED BY THE BRIDGE CONTRACTOR SHALL BE PAID FOR AS EXTRA WORK.

THE BRIDGE CONTRACTOR SHALL PREBORE HOLES FOR ABUTMENT PILES. HOLES SHALL BE BORED TO THE ELEVATIONS SHOWN ON THE "LONGITUDINAL SECTION ALONG CENTERLINE ROADWAY" ON DESIGN SHEET 4. PILES SHALL BE DRIVEN THROUGH THE HOLES TO AT LEAST THE SPECIFIED DESIGN BEARING.

MECHANICAL SPLICE ASSEMBLIES ARE REQUIRED TO CONNECT DESIGN 1018 SUBSTRUCTURE AND SUPERSTRUCTURE ELEMENTS WITH FUTURE DESIGNS 1118 AND 1218. PART B OF THE MECHANICAL SPLICE ASSEMBLIES TO BE INSTALLED IN DESIGN 1218 SHALL BE PACKAGED NEATLY AND SECURELY, AND CLEARLY LABELED FOR THEIR INTENDED FUTURE USE. THE CONTRACTOR SHALL COORDINATE THE PACKAGE SIZE, WEIGHT LIMITS, AND DIMENSIONS, ETC. WITH THE ENGINEER. THE BUNDLED PACKAGES SHALL BE STORED SAFELY ON SITE FOR REMOVAL BY THE ENGINEER.

NOTE: SUBDRAIN SLOPED DOWNWARD 2% FROM BOTH EDGES OF ABUTMENTS TO 1-35 CONSTRUCTION SHALL EXTEND BELOW ABUTMENT FOOTING AND THRU FILL (TYPICAL BOTH ABUTMENTS).

TEMPORARY SHORING (SHEET PILE OR OTHER) SHALL BE REQUIRED AS NECESSARY TO PREVENT THE EARTH UNDER THE TRAFFIC LANE FROM SLOUGHING IN DURING CONSTRUCTION.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN FOR REVIEW. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. THE CONTRACTOR SHALL NOT PROCEED WITH INSTALLATION OF THE TEMPORARY SHORING WITHOUT NOTICE TO PROCEED FROM THE ENGINEER.

- THE TEMPORARY SHORING SUBMITTAL SHALL INCLUDE:
- DESIGN CALCULATIONS (INCLUDING A GLOBAL STABILITY ANALYSIS)
  - SOIL PROPERTIES
  - SHORING MATERIAL PROPERTIES
  - SHORING PLAN LAYOUT (SHOWING LOCATION OF TRAFFIC)
  - SHORING DETAILS

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM INCLUDING ALL COST FOR DESIGNING, FURNISHING AND INSTALLING. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 3/8 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	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

BRIDGE DECK DIMENSIONS TABLE				
NO.	ITEM	UNIT	N.B. QUANTITY	S.B. QUANTITY
1	DECK LENGTH	L.F.	197.1	197.1
2	MINIMUM DECK WIDTH	L.F.	15.8	15.8
3	MAXIMUM DECK WIDTH	L.F.	15.8	15.8
4	DECK AREA	S.F.	3114	3114

1. DECK LENGTH IS MEASURED FROM FACE-TO-FACE OF PAVING NOTCHES ALONG THE CENTERLINE OF THE ROADWAY.
- 2, 3. DECK WIDTHS ARE MEASURED FROM OUT-TO-OUT OF DECK PERPENDICULAR TO THE CENTERLINE OF ROADWAY.
4. DECK AREA IS TO BE BASED ON THE FACE-TO-FACE PAVING NOTCH DISTANCE AND OUT-TO-OUT DECK DIMENSIONS.

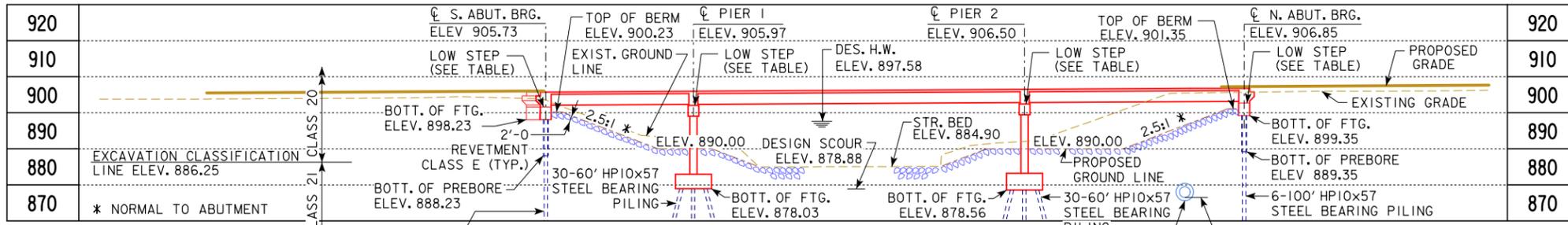
DURING CONSTRUCTION OF THIS PROJECT THE BRIDGE CONTRACTOR WILL BE REQUIRED TO COORDINATE OPERATIONS WITH THOSE OF OTHER CONTRACTORS WORKING WITHIN THE SAME AREA. OTHER WORK IN PROGRESS DURING THE SAME PERIOD OF TIME WILL INCLUDE, BUT IS NOT LIMITED TO, CONSTRUCTION OF THE FOLLOWING PROJECTS:

SHOP DRAWING SUBMITTALS	
SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)	
SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.	
1	STEEL INTERMEDIATE DIAPHRAGMS
2	TEMPORARY SHORING
3	TEMPORARY SHORING DESIGN CALCULATIONS
4	PRE-CONSTRUCTION CONDITION SURVEY REPORT
5	VIBRATION MONITORING PLAN
6	POST-CONSTRUCTION SURVEY REPORT
7	DECK EDGE ARMORING ASSEMBLIES

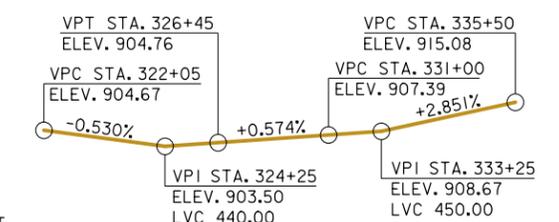
NOTE:  
 THE POLLUTION PREVENTION PLAN IS NOT INCLUDED IN THESE PLANS, BUT IS INCLUDED IN THE GRADING PLANS FOR THE PROJECT IM-NHS-035-4(140)92--03-77 WHICH IS TIED TO THE BRIDGE PLANS THROUGH THE CONTRACT LETTING PROCESS.

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

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**GENERAL NOTES**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 3 OF 29 FILE NO. 30541 DESIGN NO. 1018

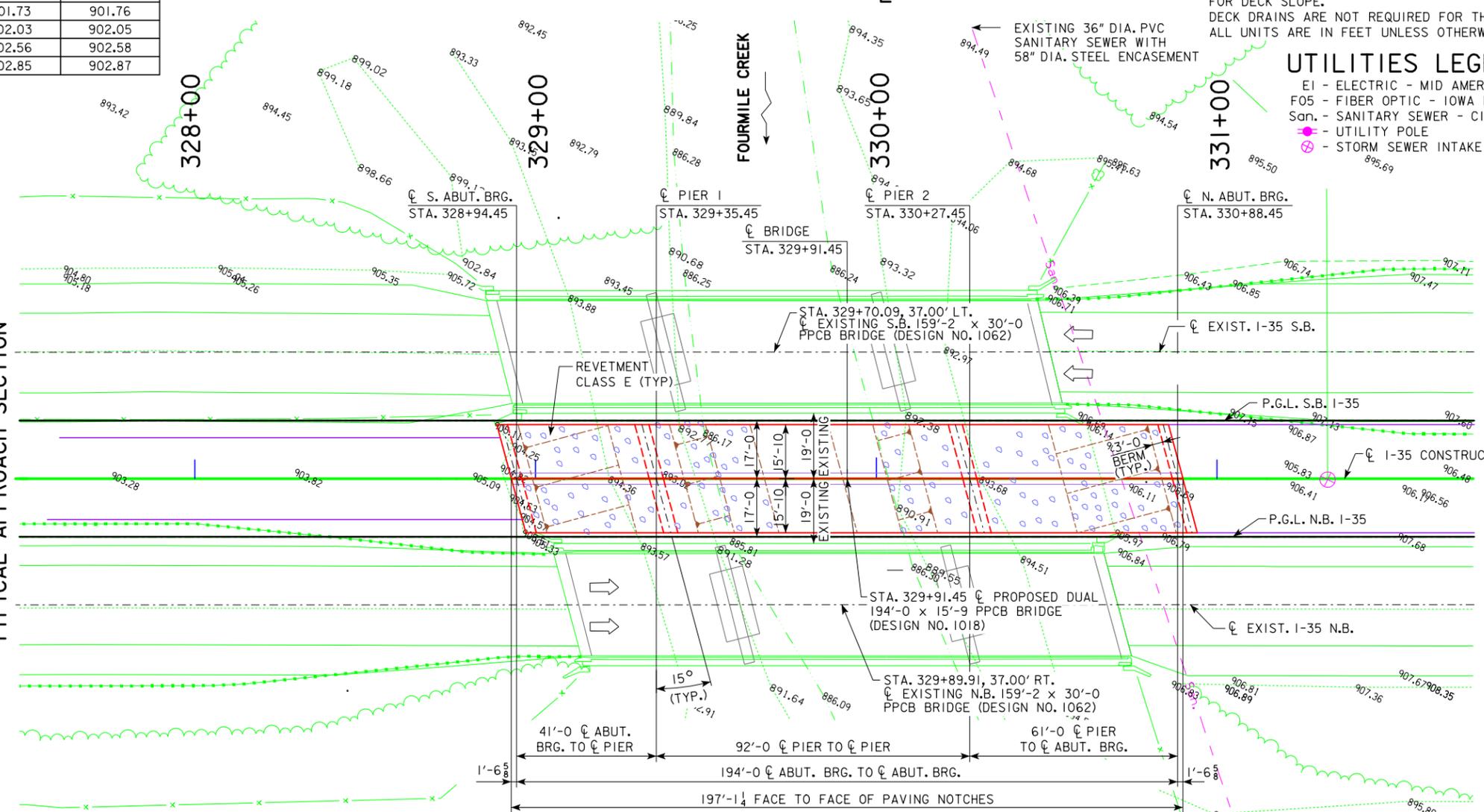


BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"X36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"X36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



**LOW STEP ELEV. TABLE**

LOCATION	S.B. BRIDGE	N.B. BRIDGE
S. ABUT.	901.73	901.76
PIER 1	902.03	902.05
PIER 2	902.56	902.58
N. ABUT.	902.85	902.87



- UTILITIES LEGEND:**
- EI - ELECTRIC - MID AMERICAN ENERGY
  - F05 - FIBER OPTIC - IOWA DOT
  - San. - SANITARY SEWER - CITY OF ANKENY
  - ⊕ - UTILITY POLE
  - ⊗ - STORM SEWER INTAKE

**PROPOSED GRADE TRAFFIC ESTIMATE**

2008 AADT	53,600	V.P.D.
2035 AADT	100,300	V.P.D.
2035 DHV	9,900	V.P.H.
TRUCKS	16	%
TOTAL DESIGN ESALS		

**HYDRAULIC DATA**

DRAINAGE AREA = 44.9 SQ. MI.  
 STREAM SLOPE = 9.9 FT./MI.  
 AVG. LOW WATER STAGE = 886.3

Q<sub>50</sub> = 5,170 CFS  
 STAGE = 896.85  
 BACKWATER = 0.24 FT.

Q<sub>100</sub> = 6,140 CFS  
 STAGE = 897.58  
 BACKWATER = 0.33 FT.  
 AVG. BRIDGE VELOCITY = 4.89 FPS

Q<sub>200</sub> = 7,280 CFS  
 STAGE = 899.68  
 CALCULATED DESIGN SCOUR = 878.88

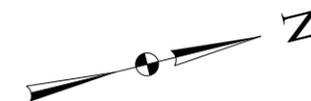
Q<sub>500</sub> = 8,720 CFS  
 STAGE = 900.55  
 CALCULATED CHECK SCOUR = 877.91

ROADWAY OVERTOP 904.54  
 STA. 322+28

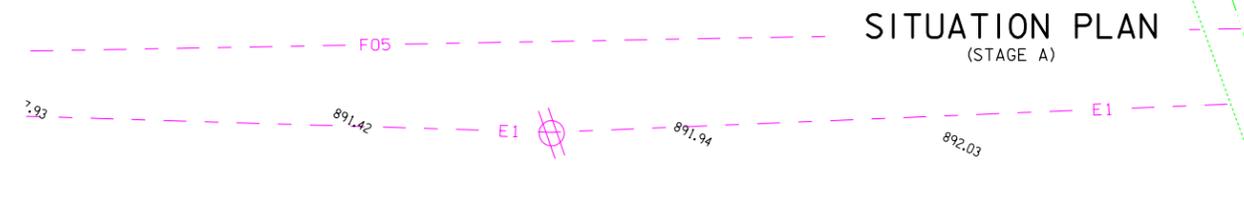
50, 100 & 500 YR. STAGES AND DISCHARGES FROM CITY OF ANKENY F.I.S., DATED DECEMBER 6, 1999. F.I.S. DATUM (NGVD29) 0.1 FT. BELOW PROJECT DATUM (NAVD88).

**LOCATION**

I-35 OVER FOURMILE CREEK  
 T-80 N R-23 W  
 SECTION 7  
 DOUGLAS TOWNSHIP  
 POLK COUNTY  
 CITY OF ANKENY  
 N.B. FHWA NO. 41811  
 S.B. FHWA NO. 41821  
 N.B. BRIDGE MAINT. NO. 7793.6R035  
 S.B. BRIDGE MAINT. NO. 7793.6L035  
 LATITUDE: 41.747287°  
 LONGITUDE: -93.575179°



**SITUATION PLAN (STAGE A)**



**HYDRAULIC 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.

*Adam Bullerman* 03-13-2017  
 Signature Date  
**Adam R. Bullerman**  
 Printed or Typed Name  
 My license renewal date is December 31, 2018

Pages or sheets covered by this seal: 5 AND 34 (HYDRAULIC DATA)

DESIGN FOR 15° SKEW (R.A.)

**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**

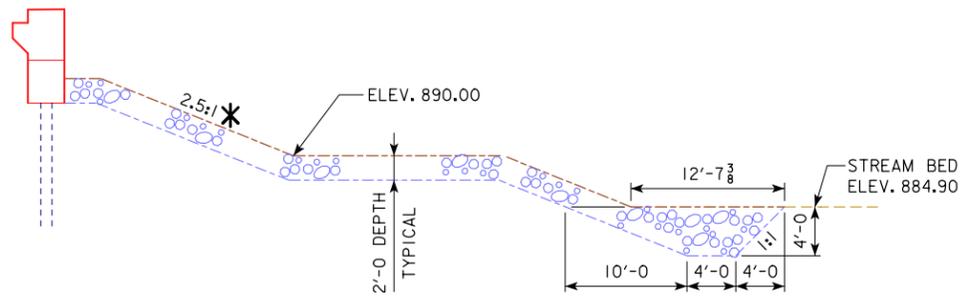
41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN

**SITUATION PLAN**

STATION 329+91.45 (STAGE A) MAY 2017

**POLK COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 29 FILE NO. 30451 DESIGN NO. 1018



**SECTION THRU EMBEDDED REVETMENT BERM**

\* NORMAL TO ABUTMENT

S.B. I-35 - ESTIMATED BERM ARMORING QTY				
LOCATION	REVTMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	CLASS 10 CHANNEL EXCAVATION (CY)
BERM LINING - SOUTH ABUTMENT	116	-	108	73
STONE TOE - SOUTH ABUTMENT	43	-	37	27
BERM LINING - NORTH ABUTMENT	163	-	153	102
STONE TOE - NORTH ABUTMENT	43	-	37	27
TOTALS	365	-	335	229

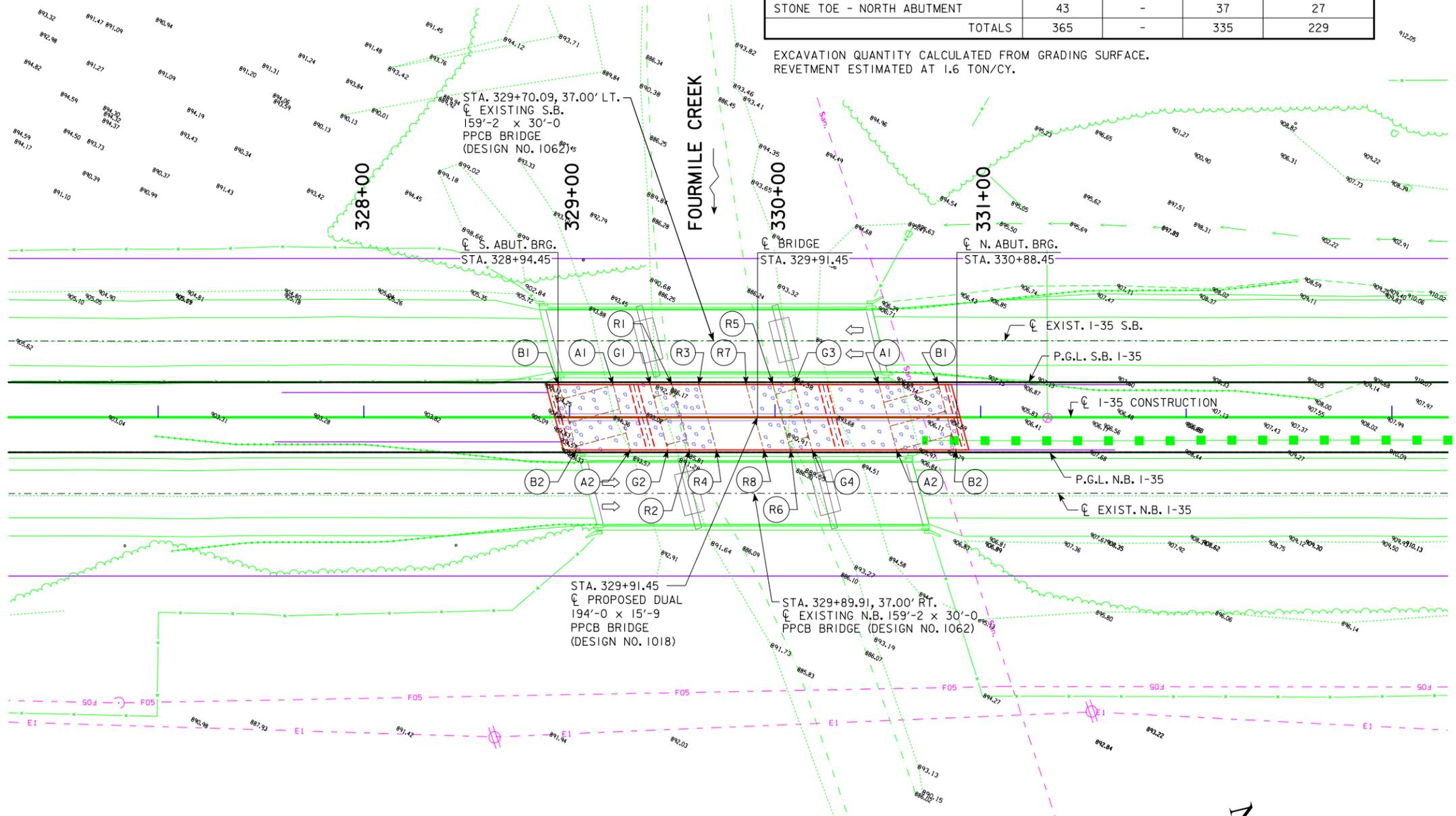
N.B. I-35 - ESTIMATED BERM ARMORING QTY				
LOCATION	REVTMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	CLASS 10 CHANNEL EXCAVATION (CY)
BERM LINING - SOUTH ABUTMENT	116	-	108	73
STONE TOE - SOUTH ABUTMENT	43	-	37	27
BERM LINING - NORTH ABUTMENT	163	-	153	102
STONE TOE - NORTH ABUTMENT	43	-	37	27
TOTALS	365	-	335	229

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

POINTS	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	329+21.19	15.83' LT	890.00	330+50.51	15.83' LT	890.00
A2	329+29.67	15.83' RT	890.00	330+58.99	15.83' RT	890.00
B1	328+94.87	15.83' LT	900.23	330+79.55	15.83' LT	901.35
B2	329+03.35	15.83' RT	900.23	330+88.03	15.83' RT	901.35

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. REVETMENT ESTIMATED AT 1.6 TON/CY.

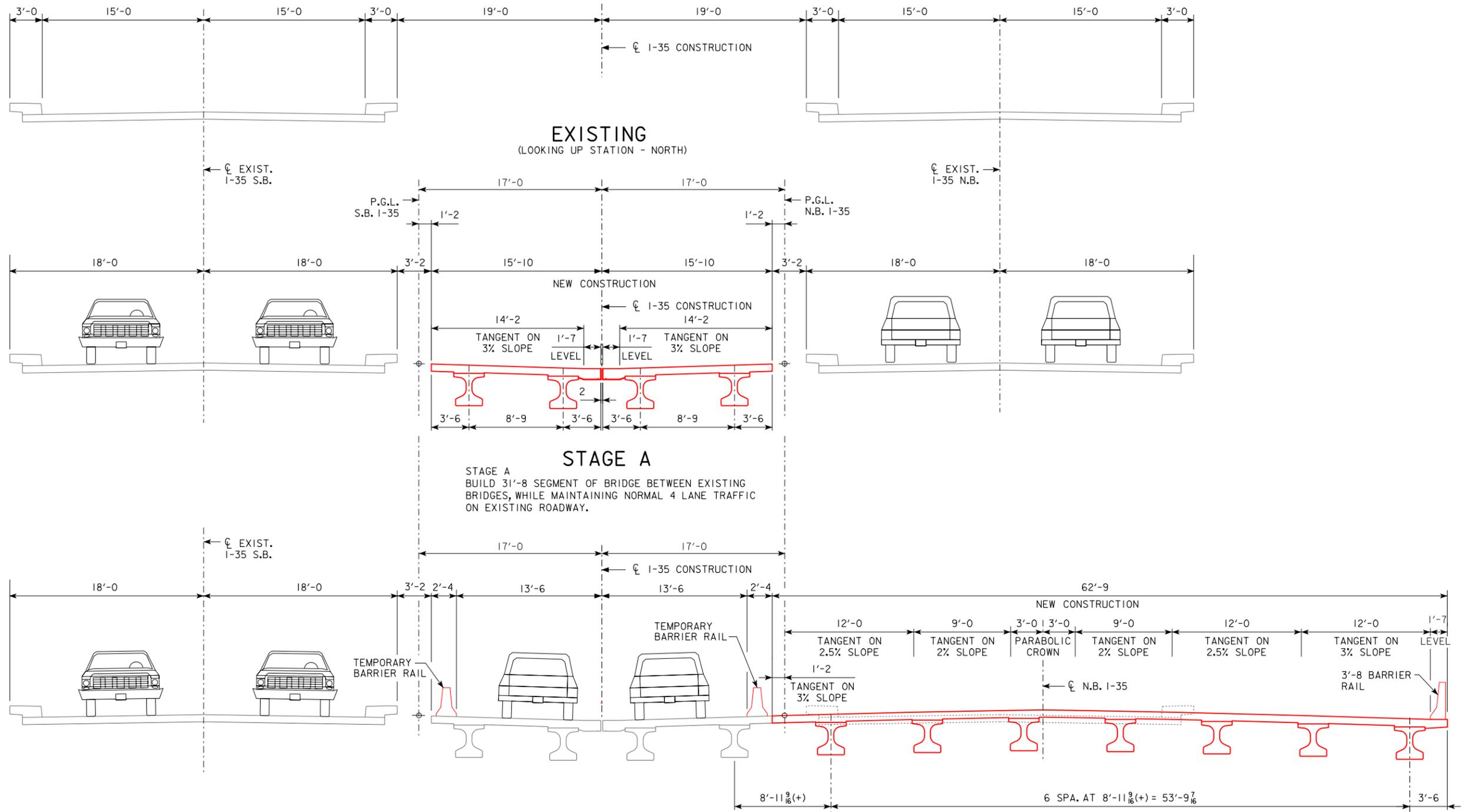


- GRADING CONTROL:
- (G1) I-35 329+39.31, 15.83' LT; EDGE OF BENCH
  - (G2) I-35 329+47.79, 15.83' RT; EDGE OF BENCH
  - (G3) I-35 330+09.51, 15.83' LT; EDGE OF BENCH
  - (G4) I-35 330+18.01, 15.83' RT; EDGE OF BENCH
- REVTMENT LAYOUT:
- (R1) I-35 329+49.87, 15.83' LT; END BERM LINING
  - (R2) I-35 329+58.35, 15.83' RT; END BERM LINING
  - (R3) I-35 329+62.93, 15.83' LT; END STONE TOE
  - (R4) I-35 329+71.41, 15.83' RT; END STONE TOE
  - (R5) I-35 329+98.95, 15.83' LT; END BERM LINING
  - (R6) I-35 330+07.45, 15.83' RT; END BERM LINING
  - (R7) I-35 329+85.93, 15.83' LT; END STONE TOE
  - (R8) I-35 329+94.42, 15.83' RT; END STONE TOE

- UTILITIES LEGEND:
- E1 - ELECTRIC - MID AMERICAN ENERGY
  - F05 - FIBER OPTIC - IOWA DOT
  - San. - SANITARY SEWER - CITY OF ANKENY
  - Utility Pole
  - Storm Sewer Intake

**SITE PLAN (STAGE A)**  
 NOTE: ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**SITE PLAN (STAGE A)**  
 STATION 329+91.45 MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 5 OF 29 FILE NO. 30451 DESIGN NO. 1018



**EXISTING**

(LOOKING UP STATION - NORTH)

**NEW CONSTRUCTION**

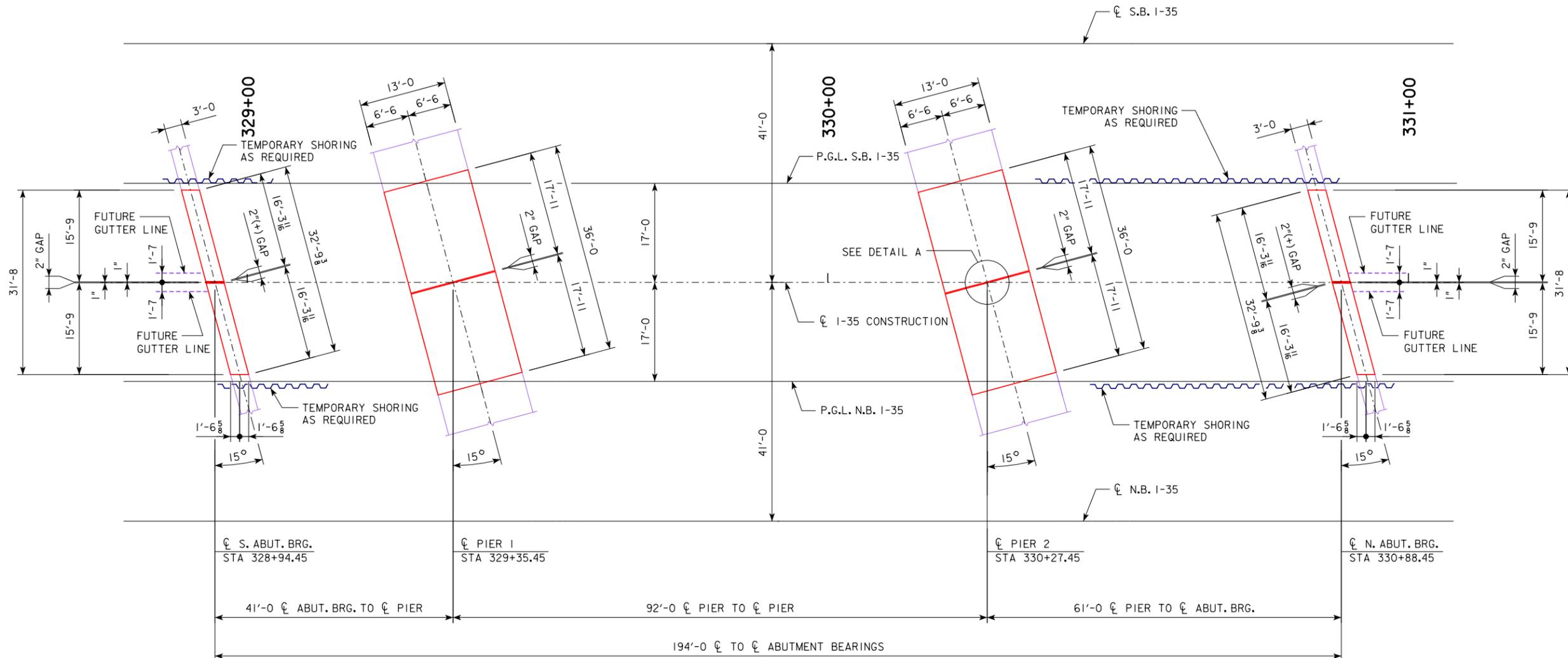
**STAGE A**

STAGE A  
 BUILD 31'-8" SEGMENT OF BRIDGE BETWEEN EXISTING  
 BRIDGES, WHILE MAINTAINING NORMAL 4 LANE TRAFFIC  
 ON EXISTING ROADWAY.

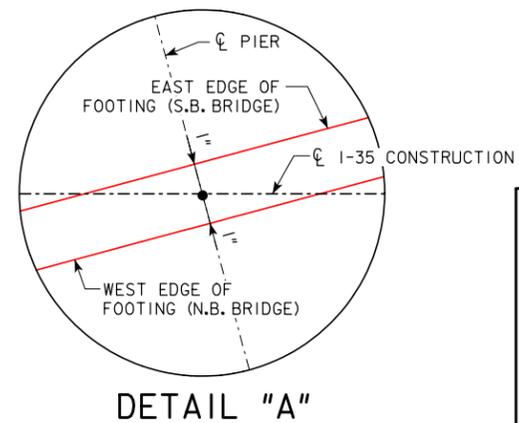
**STAGE B**

STAGE B  
 SHIFT NORTHBOUND TRAFFIC ON NEW "CENTER" BRIDGE SEGMENT. REMOVE  
 EXISTING NORTHBOUND BRIDGE AND CONSTRUCT REMAINING PORTION OF  
 NORTHBOUND BRIDGE. MAINTAIN SOUTHBOUND TRAFFIC ON EXISTING  
 SOUTHBOUND BRIDGE.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**STAGING**  
 (STAGE A)  
 STATION 329+91.45 MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 6 OF 29 FILE NO. 30451 DESIGN NO. 1018

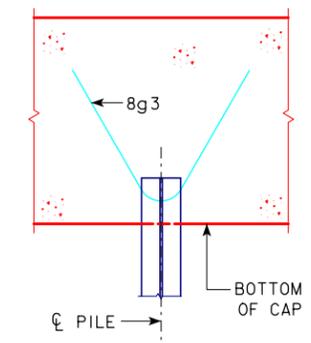
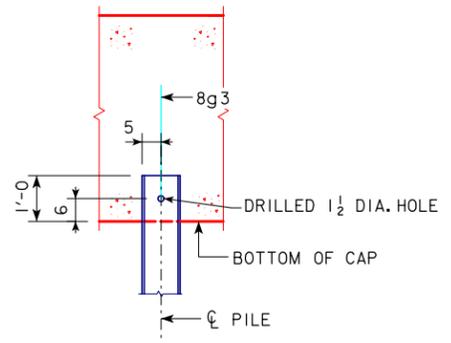
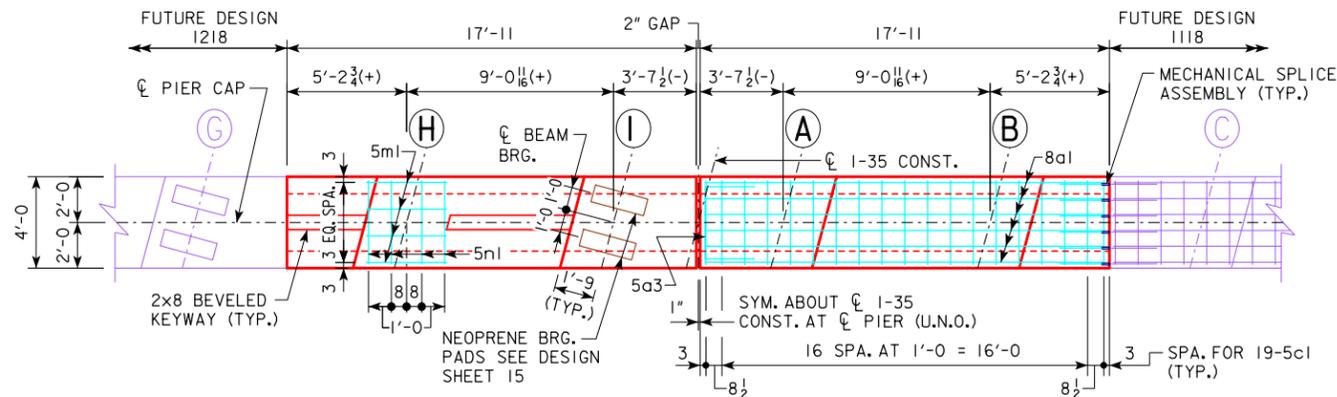


STAKING DIAGRAM



DETAIL "A"

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**STAKING DIAGRAM**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 7 OF 29 FILE NO. 30541 DESIGN NO. 1018

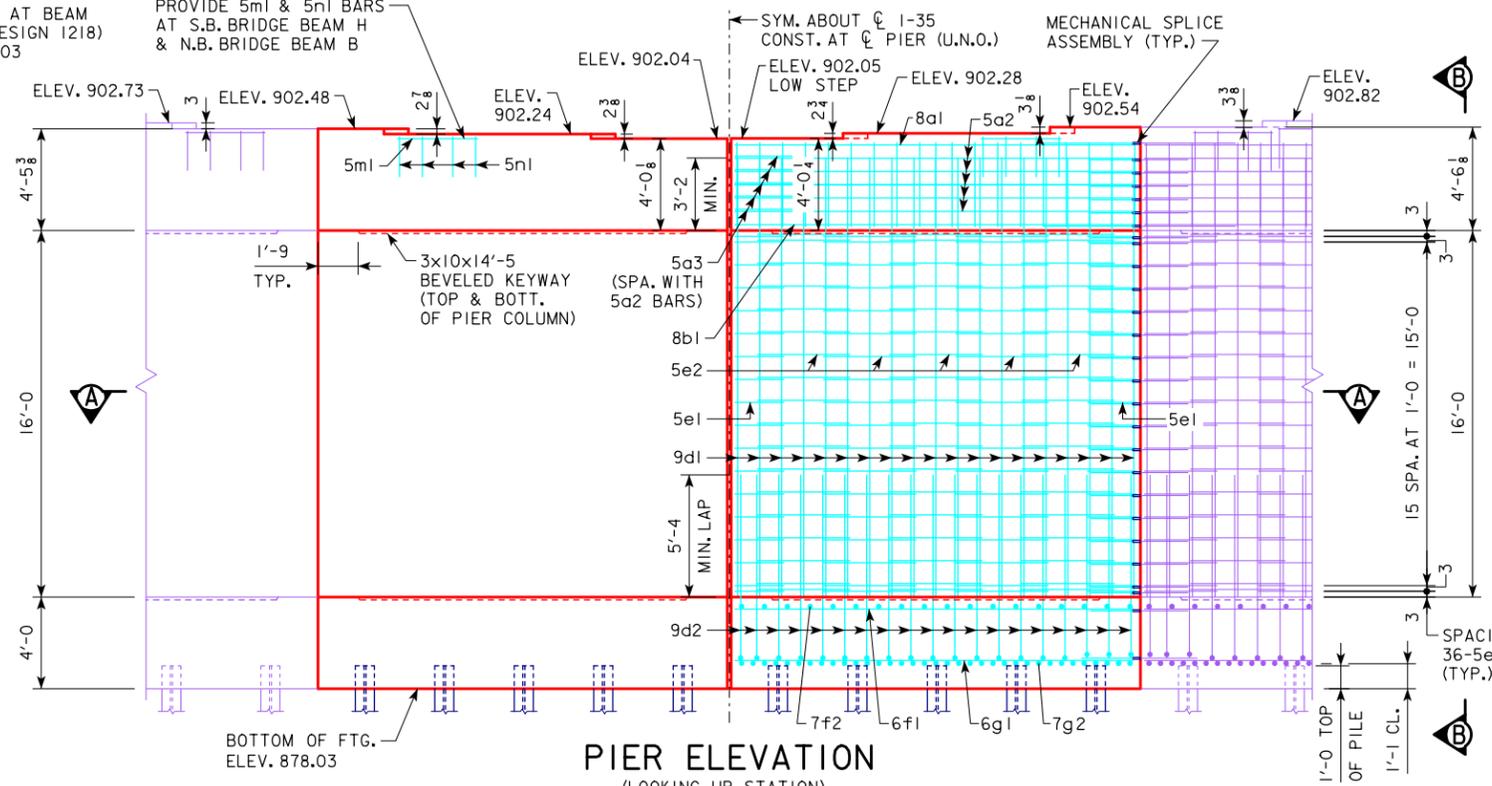


PILE UPLIFT ANCHOR DETAIL

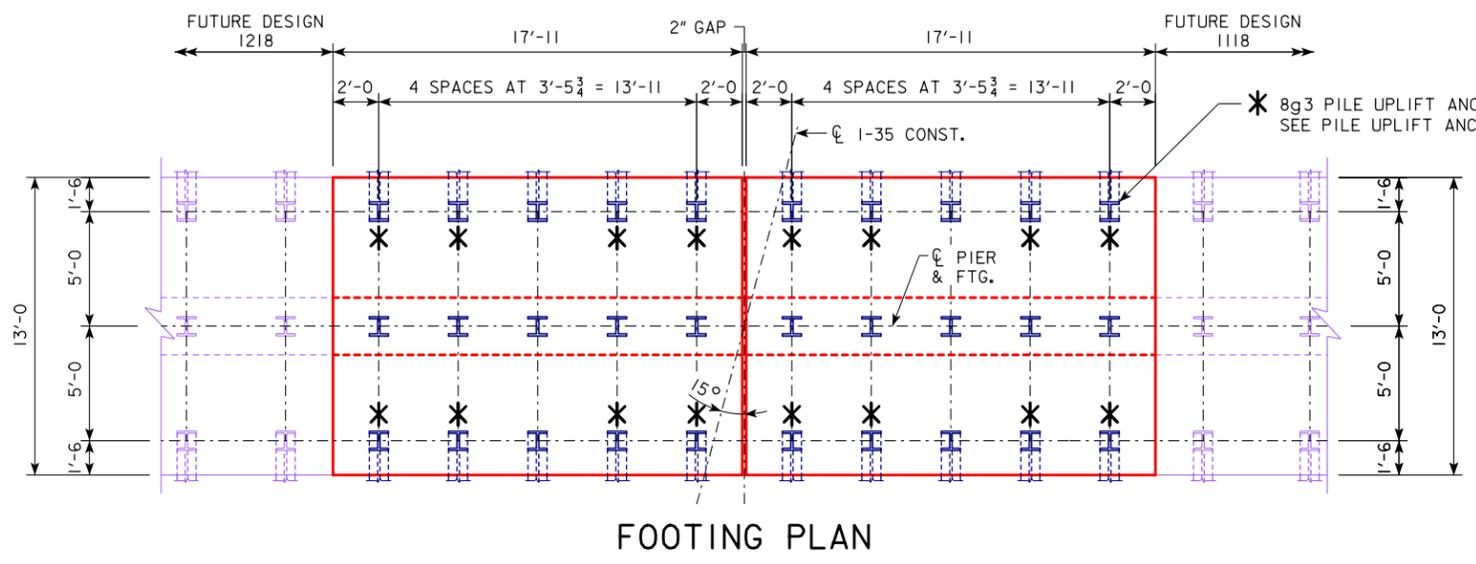
LOW STEP AT BEAM LINE A (DESIGN 1218) ELEV. 902.03

PROVIDE 5ml & 5nl BARS AT S.B. BRIDGE BEAM H & N.B. BRIDGE BEAM B

PIER CAP PLAN



PIER ELEVATION (LOOKING UP STATION)



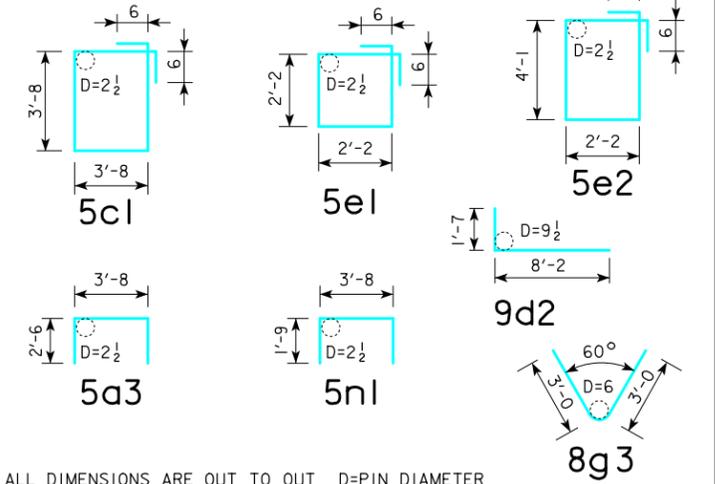
FOOTING PLAN

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"X36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"X36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

REINFORCING BAR LIST- PIER I (S.B. BRIDGE AND N.B. BRIDGE INCLUDED)

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	CAP, LONGITUDINAL, TOP		12	17'-5"	558
5a2	CAP, LONGITUDINAL, SIDES		20	17'-5"	363
5a3	CAP, HAIRPIN, END		10	8'-6"	89
8b1	CAP, LONGITUDINAL, BOTTOM		8	17'-5"	372
5c1	CAP, HOOPS		38	15'-8"	621
9d1	COLUMN, VERTICAL		88	19'-2"	5735
9d2	COLUMN, VERTICAL, DOWELS		88	9'-9"	2917
5e1	COLUMN, HOOPS, END		72	9'-8"	726
5e2	COLUMN, HOOPS		180	13'-6"	2534
6f1	FOOTING, LONGITUDINAL, TOP		26	17'-5"	680
7f2	FOOTING, TRANSVERSE, TOP		36	12'-8"	932
6g1	FOOTING, LONGITUDINAL, BOTTOM		26	17'-5"	680
7g2	FOOTING, TRANSVERSE, BOTTOM		70	12'-8"	1812
8g3	PILE UPLIFT ANCHOR		16	6'-0"	256
5ml	CAP, STEP, LONGITUDINAL		8	3'-6"	29
5nl	CAP, STEP, TRANSVERSE		8	7'-2"	60
REINFORCING STEEL - TOTAL (LBS.)					18,364

BENT BAR DETAILS



ALL DIMENSIONS ARE OUT TO OUT D=PIN DIAMETER

CONCRETE PLACEMENT QUANTITIES

LOCATION	S.B. BRIDGE QUANTITY	N.B. BRIDGE QUANTITY
CAP	11.1	11.2
COLUMN	26.5	26.5
FOOTING	34.5	34.5
TOTAL (CY)	72.1	72.2

NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

NOTE: FOR SECTION A-A, B-B, FOOTING REINFORCING PLAN, AND PIER NOTES SEE DESIGN SHEET 9.

30 - HPI0 x 57 STEEL BEARING PILING REQUIRED AT PIER I (15 - S.B. BRIDGE, 15 - N.B. BRIDGE).

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN THE PLACEMENT OF REINFORCING.

DIMENSIONS SHOWN ON PILING LAYOUT ARE AT THE BOTTOM OF FOOTING. BATTER PILES 1:4 IN DIRECTION SHOWN.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**PIER I DETAILS - PLAN AND ELEV.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 8 OF 29 FILE NO. 30541 DESIGN NO. 1018

### PIER NOTES:

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED.

ALL EXPOSED CORNERS 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

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

THE 9d2 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE 8a1, 5a2, AND 8b1 IN THE PIER CAP, THE 5e1 BARS IN THE PIER COLUMN, AND 6f1 AND 6g1 IN THE FOOTING, SHALL BE SPLICED AT THE STAGE CONSTRUCTION JOINT USING MECHANICAL SPLICE ASSEMBLIES. MECHANICAL SPLICE ASSEMBLIES CONSIST OF MECHANICAL SPLICERS AND REINFORCING SPLICE BARS AS REQUIRED TO FACILITATE THE USE OF THE MECHANICAL SPLICER. THE MECHANICAL SPLICE ASSEMBLY USED SHALL MEET THE REQUIREMENTS OF MATERIALS IN 451 APPENDIX E. REINFORCING SPLICE BARS SHALL MATCH SIZE OF BAR TO BE SPLICED.

THE COST OF ALL SPLICE ASSEMBLIES IS TO BE INCLUDED IN THE PRICE BID FOR "REINFORCING STEEL" AND NO SEPARATE PAYMENT WILL BE MADE. THE WEIGHT OF MECHANICAL SPLICE ASSEMBLIES IS NOT INCLUDED IN THE QUANTITY SHOWN FOR "REINFORCING STEEL". A TOTAL OF 20 - #8 PIER CAP (10 - S.B. BRIDGE, 10 - N.B. BRIDGE), 20 - #5 PIER CAP (10 - S.B. BRIDGE, 10 - N.B. BRIDGE), 72 - #5 PIER COLUMN (36 - S.B. BRIDGE, 36 - N.B. BRIDGE), AND 52 - #6 PIER FOOTING (26 - S.B. BRIDGE, 26 - N.B. BRIDGE) SPLICE ASSEMBLIES WILL BE REQUIRED FOR EACH PIER.

### PIER I PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 60 FEET FOR THE PIER I PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 115 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ALSO WERE DESIGNED FOR A FACTORED TENSION FORCE OF 28 KIPS.

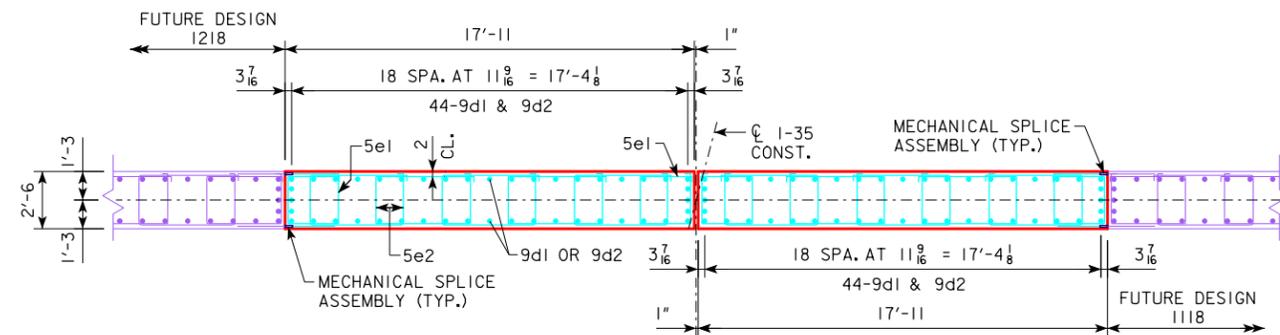
THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.77. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER I PILES IS 75 TONS AT END OF DRIVE. IF RETAPS ARE NECESSARY TO ACHIEVE BEARING, THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE IS 89 TONS AT ONE-DAY OR LATER RETAPS. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

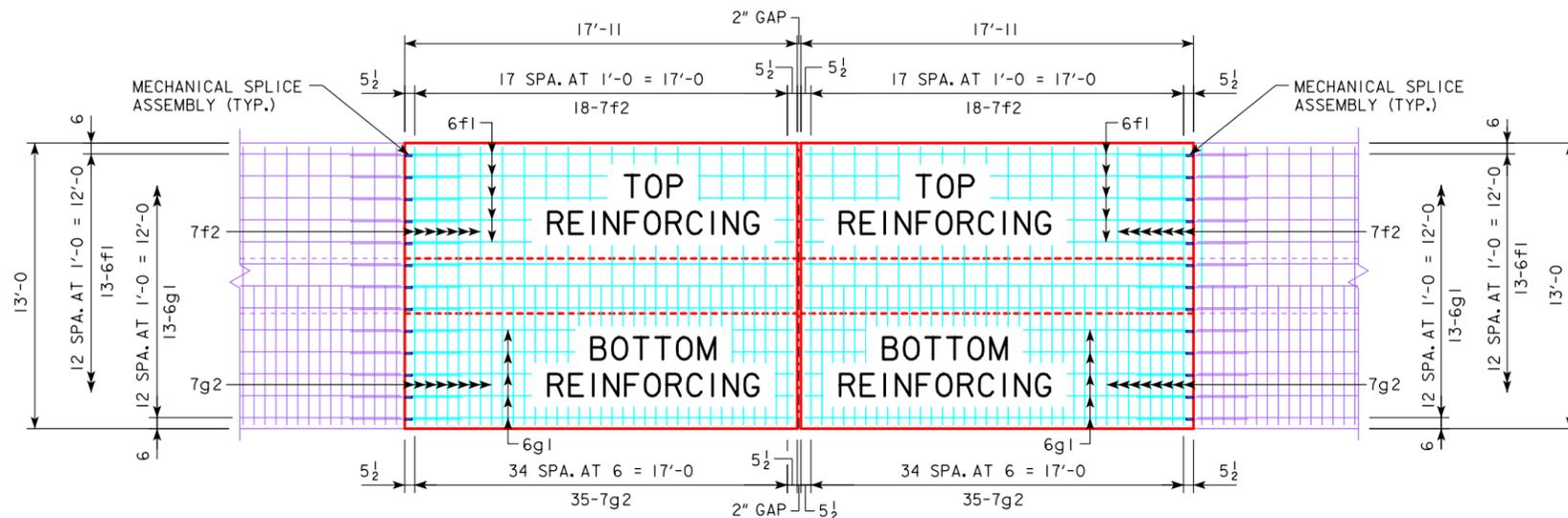
LOW STEP BEAM LINE A  
(DESIGN 1218), MINIMUM  
4'-0" CAP DEPTH (DESIGN 1218)

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

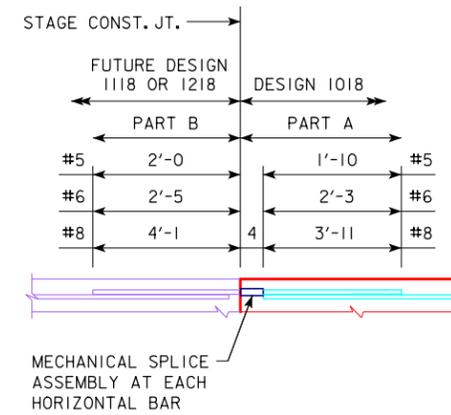
ΔΔ 4'-0 1/8 S.B. BRIDGE  
4'-0 1/4 N.B. BRIDGE (LOW STEP)



SECTION A-A

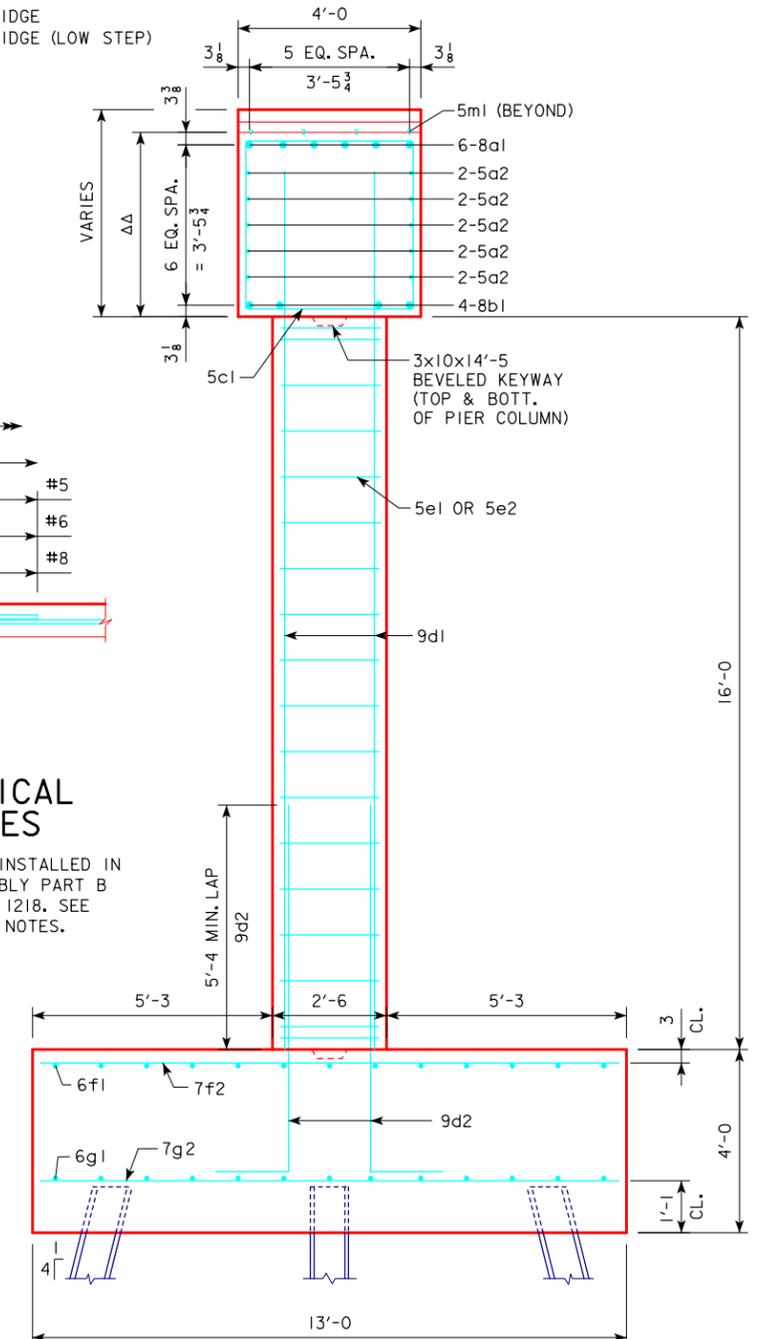


FOOTING PLAN



### DETAIL OF MECHANICAL SPLICE ASSEMBLIES

MECHANICAL SPLICE ASSEMBLY PART A INSTALLED IN DESIGN 1018. MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118 OR 1218. SEE GENERAL NOTES SHEET FOR ADDITIONAL NOTES.



SECTION B-B

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**PIER I DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 9 OF 29 FILE NO. 30541 DESIGN NO. 1018

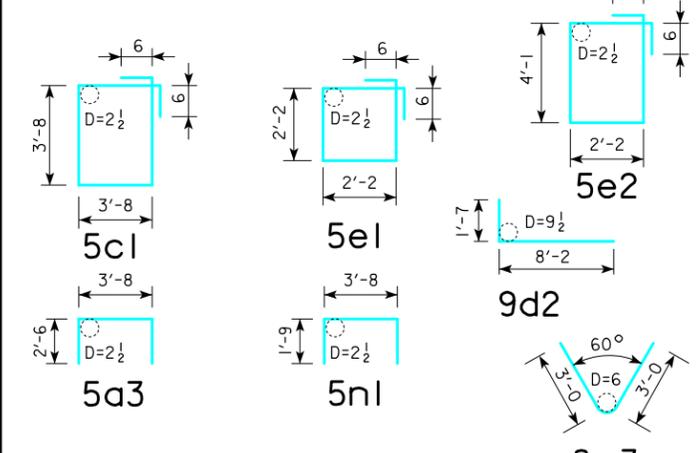
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

### REINFORCING BAR LIST- PIER 2

(S.B. BRIDGE AND N.B. BRIDGE INCLUDED)

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	CAP, LONGITUDINAL, TOP		12	17'-5"	558
5a2	CAP, LONGITUDINAL, SIDES		20	17'-5"	363
5a3	CAP, HAIRPIN, END		10	8'-6"	89
8b1	CAP, LONGITUDINAL, BOTTOM		8	17'-5"	372
5c1	CAP, HOOPS		38	15'-8"	621
9d1	COLUMN, VERTICAL		88	19'-2"	5735
9d2	COLUMN, VERTICAL, DOWELS		88	9'-9"	2917
5e1	COLUMN, HOOPS, END		72	9'-8"	726
5e2	COLUMN, HOOPS		180	13'-6"	2534
6f1	FOOTING, LONGITUDINAL, TOP		26	17'-5"	680
7f2	FOOTING, TRANSVERSE, TOP		36	12'-8"	932
6g1	FOOTING, LONGITUDINAL, BOTTOM		26	17'-5"	680
7g2	FOOTING, TRANSVERSE, BOTTOM		70	12'-8"	1812
8g3	PILE UPLIFT ANCHOR		16	6'-0"	256
5m1	CAP, STEP, LONGITUDINAL		8	3'-6"	29
5n1	CAP, STEP, TRANSVERSE		8	7'-2"	60
REINFORCING STEEL - TOTAL (LBS.)					18,364

### BENT BAR DETAILS

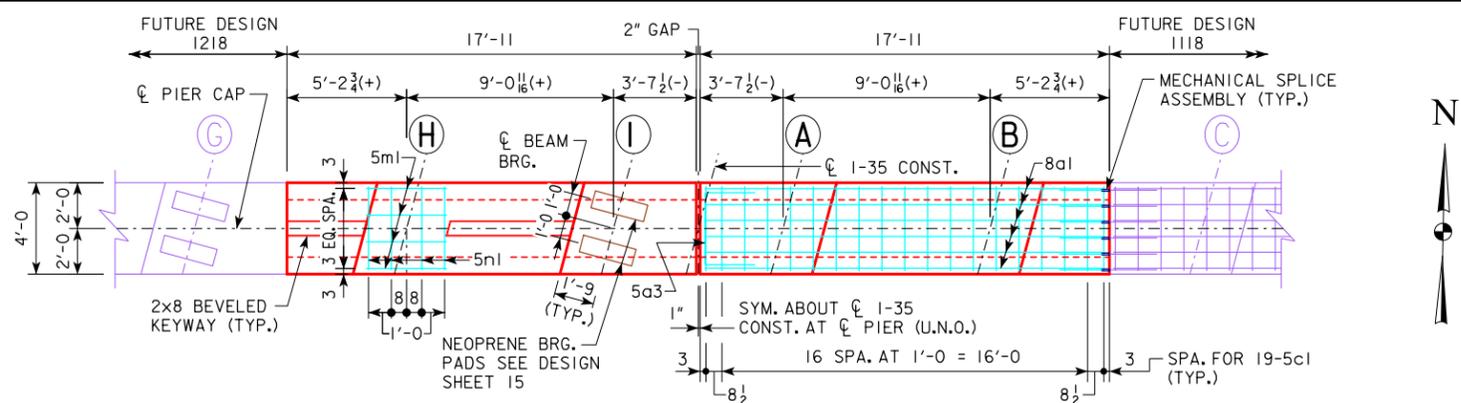


### CONCRETE PLACEMENT QUANTITIES

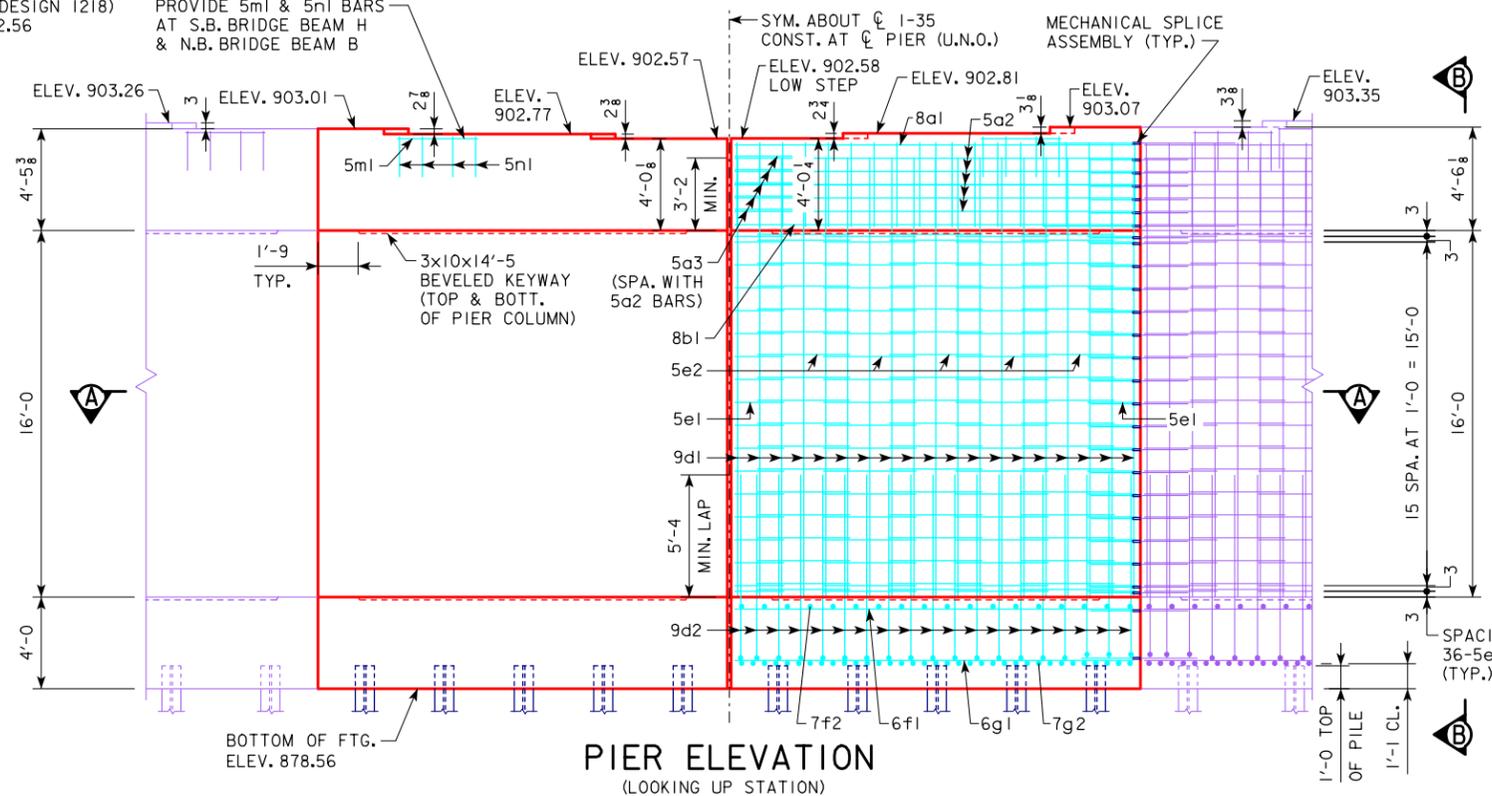
LOCATION	S.B. BRIDGE QUANTITY	N.B. BRIDGE QUANTITY
CAP	11.1	11.2
COLUMN	26.5	26.5
FOOTING	34.5	34.5
TOTAL (CY)	72.1	72.2

NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**PIER 2 DETAILS - PLAN AND ELEV.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 10 OF 29 FILE NO. 30541 DESIGN NO. 1018

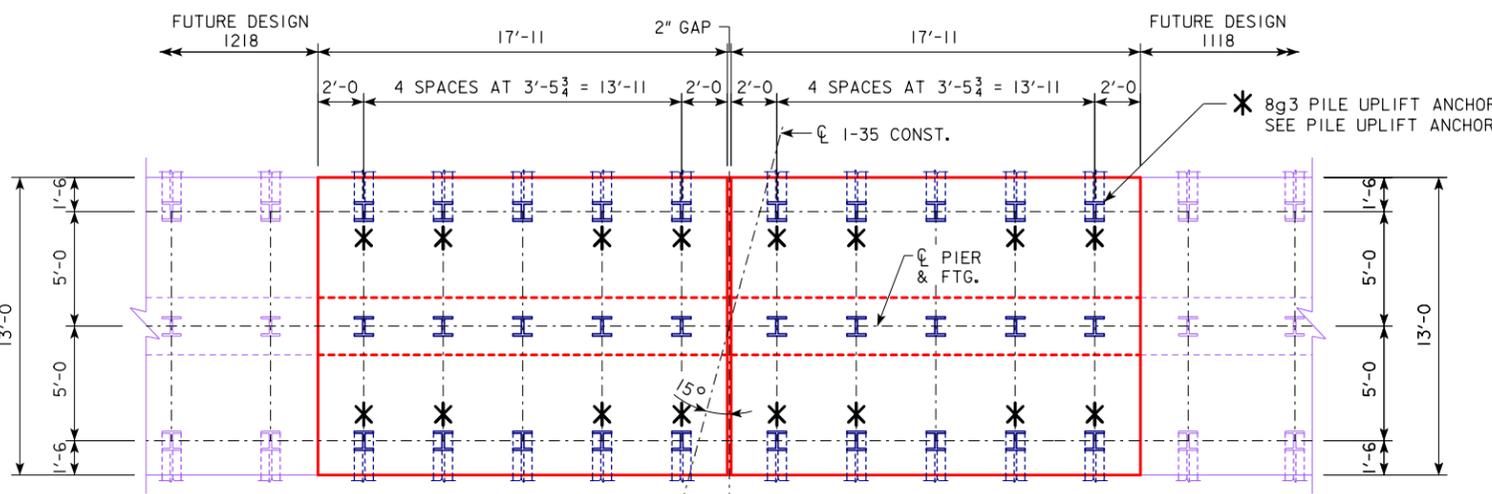


### PIER CAP PLAN



### PIER ELEVATION

(LOOKING UP STATION)



### FOOTING PLAN

NOTE: FOR PIER NOTES SEE DESIGN SHEET 9.

FOR SECTION A-A, B-B, AND FOOTING REINFORCING PLAN SEE DESIGN SHEET 11.

30 - HPI0 x 57 STEEL BEARING PILING REQUIRED AT PIER 2 (15 - S.B. BRIDGE, 15 - N.B. BRIDGE).

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN THE PLACEMENT OF REINFORCING.

DIMENSIONS SHOWN ON PILING LAYOUT ARE AT THE BOTTOM OF FOOTING. BATTER PILES 1:4 IN DIRECTION SHOWN.

**PIER NOTES:**

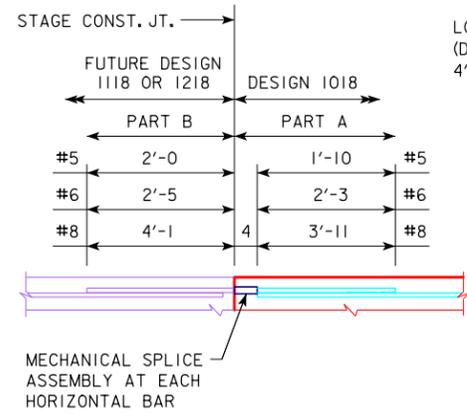
FOR PIER NOTES SEE DESIGN SHEET 9.

**PIER 2 PILE DRIVING NOTES:**

THE CONTRACT LENGTH OF 60 FEET FOR THE PIER 2 PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 121 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ALSO WERE DESIGNED FOR A FACTORED TENSION FORCE OF 30 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.77. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER 2 PILES IS 79 TONS AT END OF DRIVE. IF RETAPS ARE NECESSARY TO ACHIEVE BEARING, THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE IS 93 TONS AT ONE-DAY OR LATER RETAPS. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



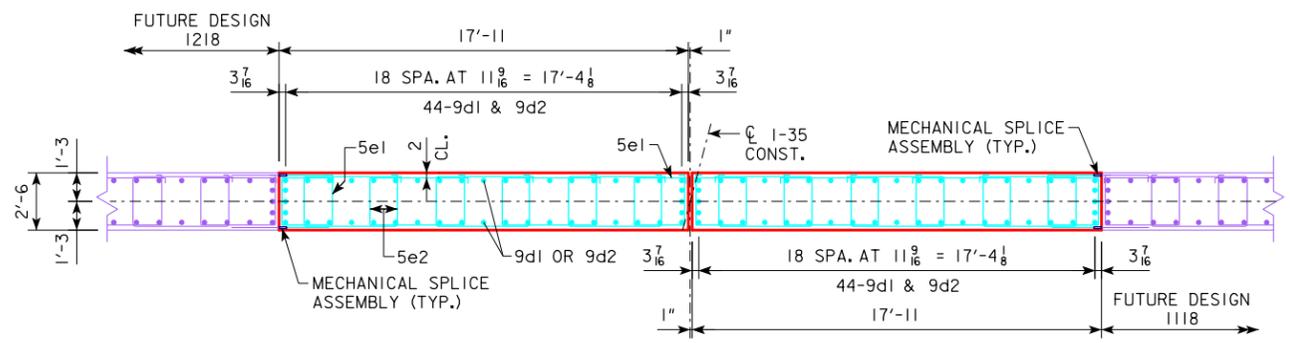
**DETAIL OF MECHANICAL SPLICE ASSEMBLIES**

MECHANICAL SPLICE ASSEMBLY PART A INSTALLED IN DESIGN 1018. MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118 OR 1218. SEE GENERAL NOTES SHEET FOR ADDITIONAL NOTES.

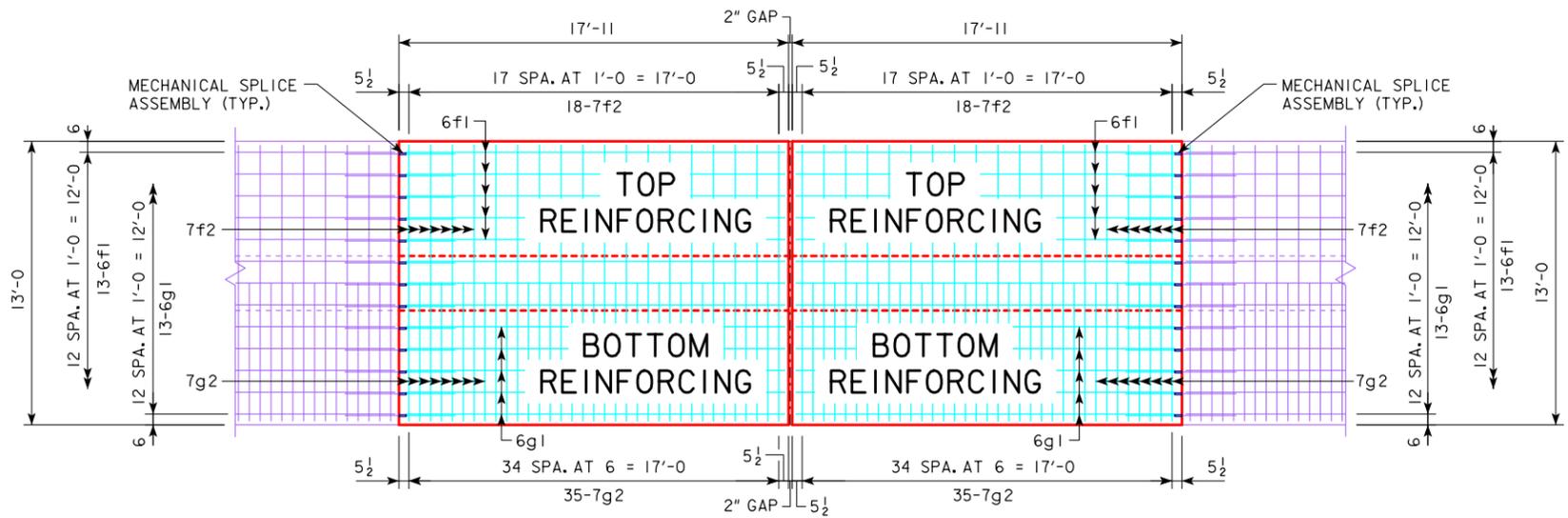
LOW STEP BEAM LINE A (DESIGN 1218), MINIMUM 4'-0" CAP DEPTH (DESIGN 1218)

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

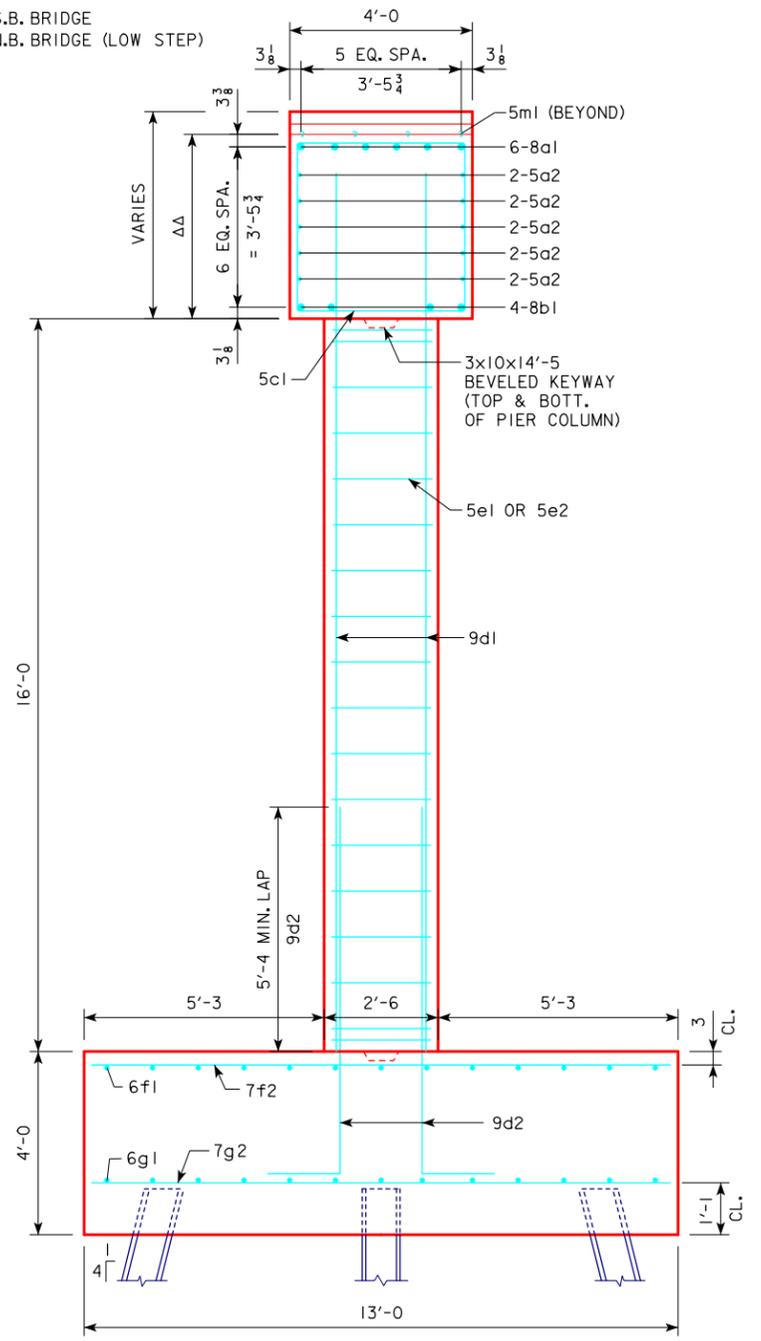
ΔΔ 4'-0" S.B. BRIDGE  
 4'-0" N.B. BRIDGE (LOW STEP)



**SECTION A-A**



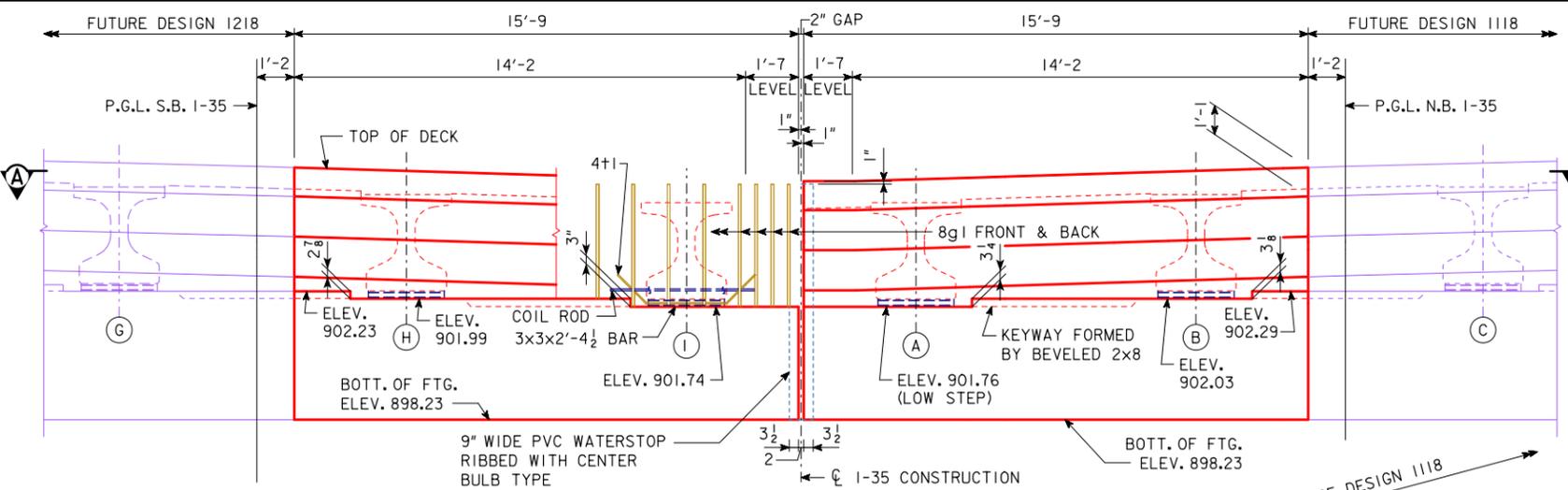
**FOOTING PLAN**



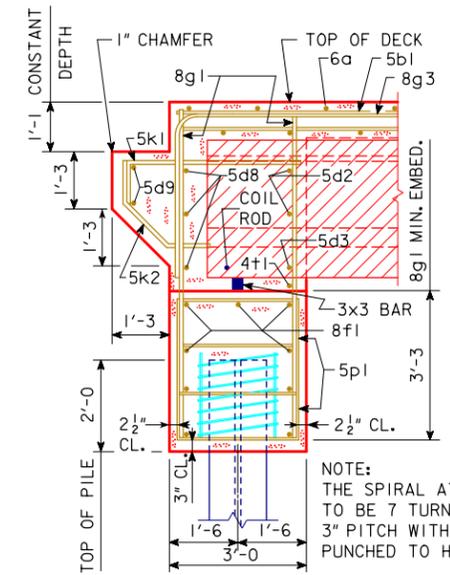
**SECTION B-B**



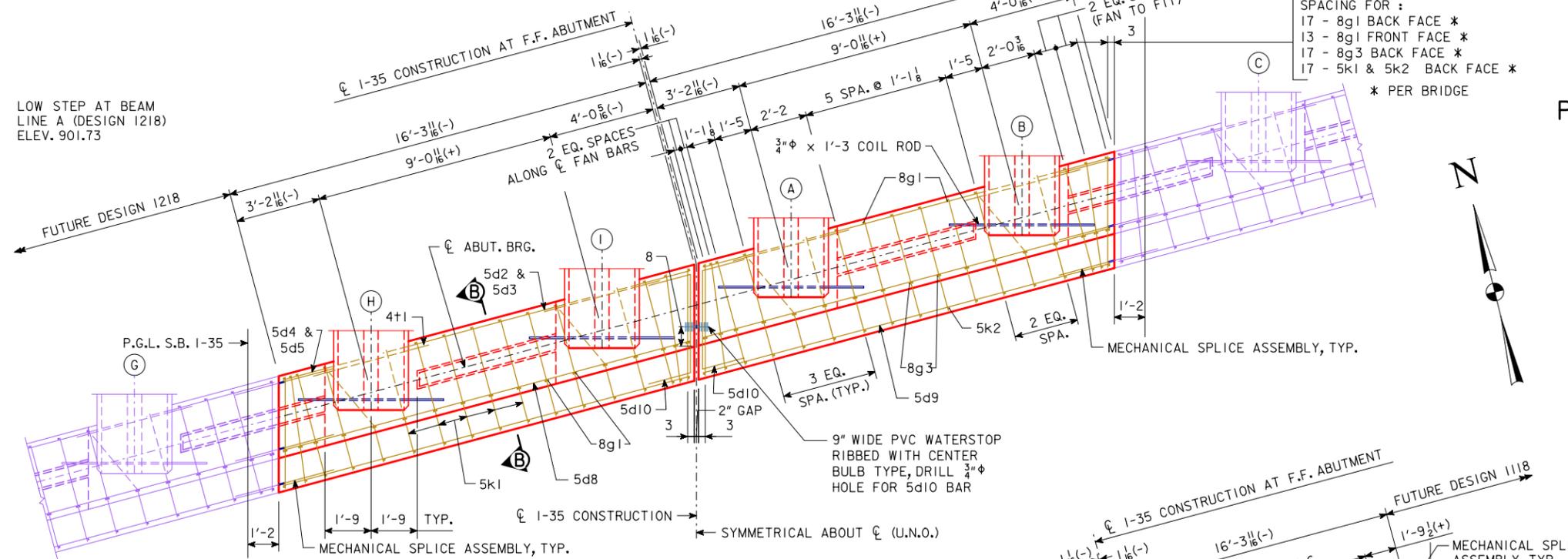
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**PIER 2 DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 11 OF 29 FILE NO. 30541 DESIGN NO. 1018



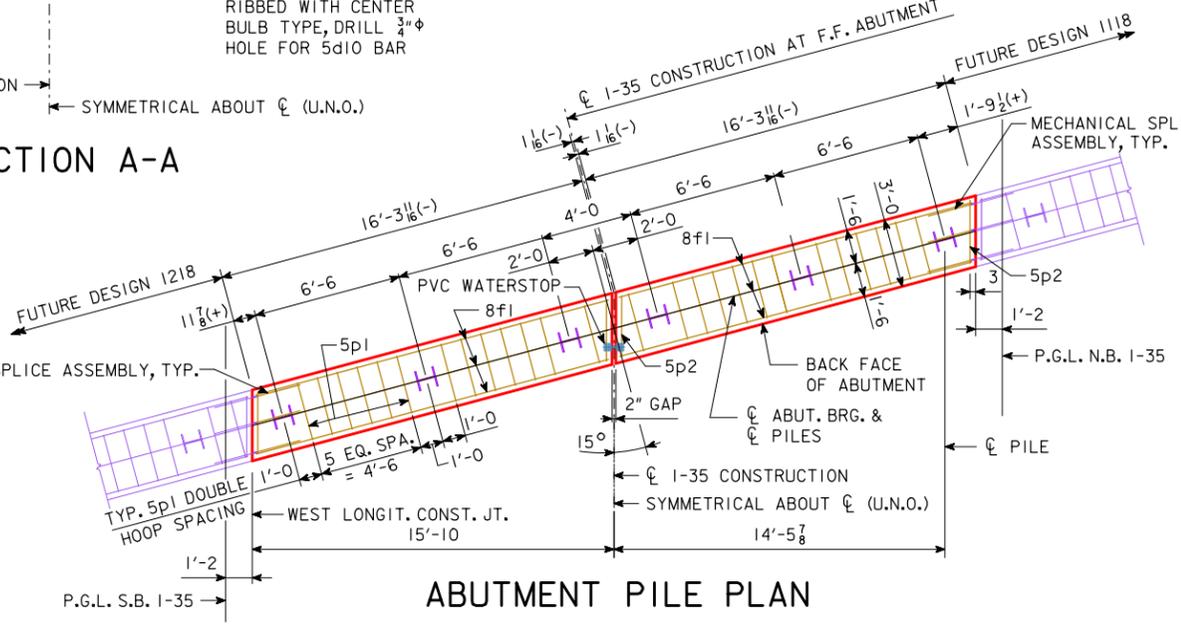
**PART REAR ELEVATION AT ABUTMENT**



**PART SECTION B-B**



**PART SECTION A-A**



**ABUTMENT PILE PLAN**

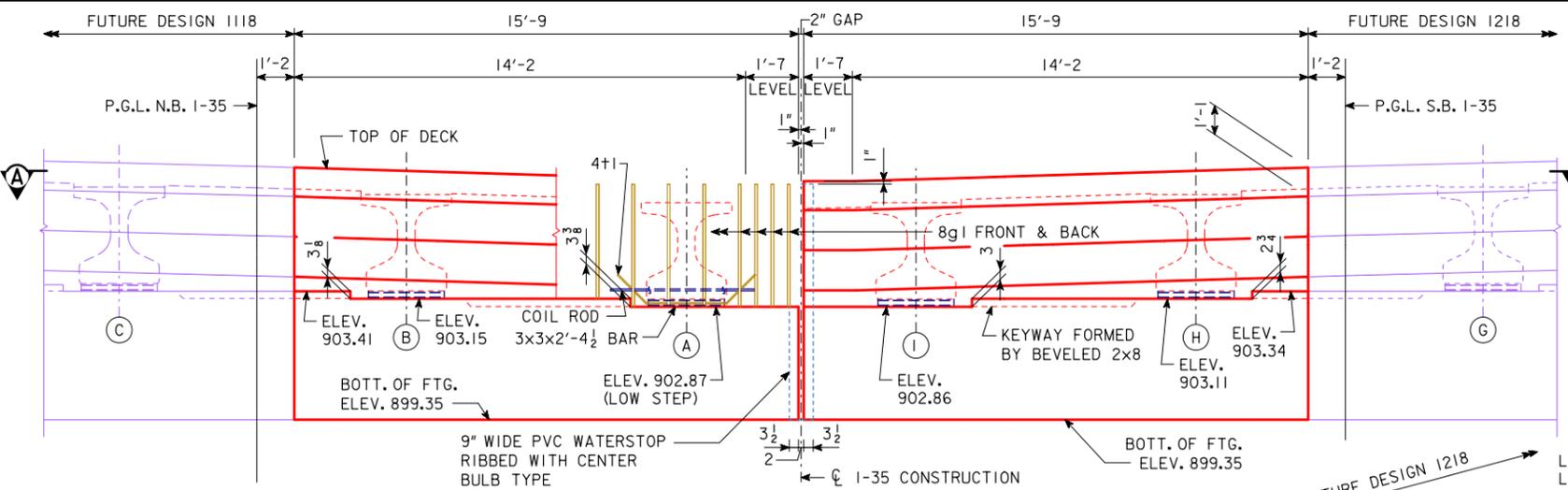
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10"± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10"± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

ABUTMENT CONCRETE QUANTITY	
LOCATION	QUANTITY
SOUTH ABUTMENT FOOTING (S.B. BRIDGE)	6.7
SOUTH ABUTMENT FOOTING (N.B. BRIDGE)	6.8
TOTAL (CU. YDS.)	13.5

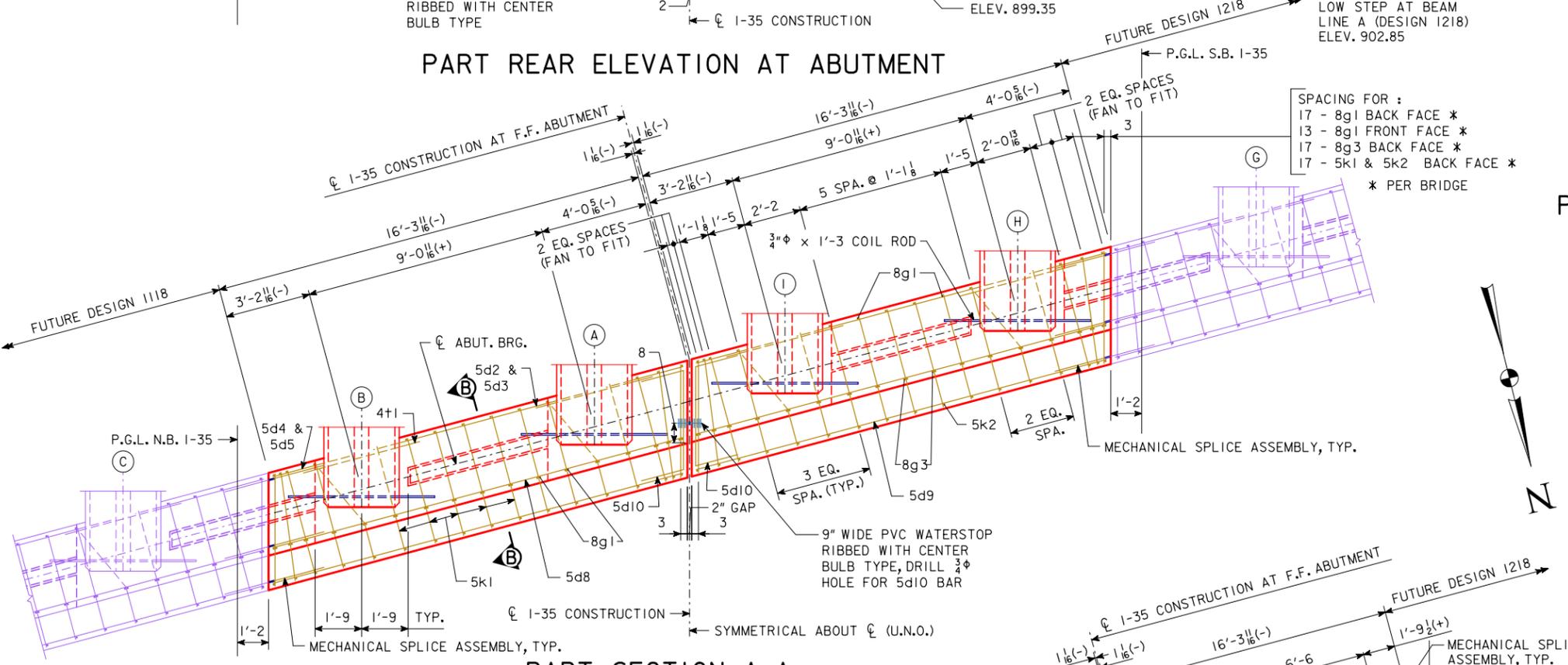
NOTE: CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.  
 NOTES:  
 6 - HP 10 x 57 STEEL BEARING PILING REQUIRED AT SOUTH ABUTMENT (3 - S.B. BRIDGE, 3 - N.B. BRIDGE).  
 SEE DESIGN SHEET 20 FOR MECHANICAL SPLICE ASSEMBLY NOTES AND ABUTMENT PILE DRIVING NOTES.  
 DECK EDGE ARMORING NOT SHOWN FOR CLARITY. SEE DESIGN SHEET 16 FOR DETAILS.

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

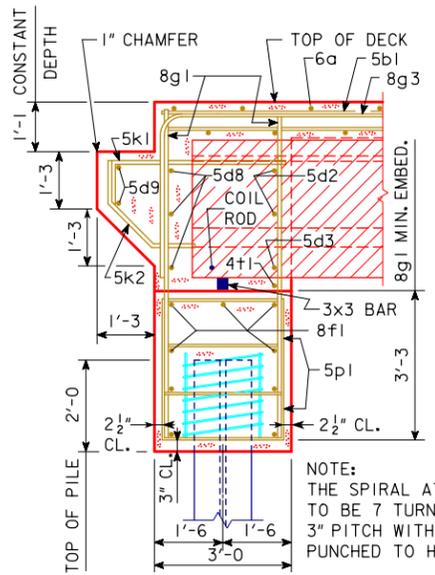
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**SOUTH ABUTMENT PLAN/REAR ELEV.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 12 OF 29 FILE NO. 30541 DESIGN NO. 1018



PART REAR ELEVATION AT ABUTMENT



PART SECTION A-A



PART SECTION B-B

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10"± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10"± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

SPACING FOR :  
 17 - 8g1 BACK FACE \*  
 13 - 8g1 FRONT FACE \*  
 17 - 8g3 BACK FACE \*  
 17 - 5k1 & 5k2 BACK FACE \*  
 \* PER BRIDGE

ABUTMENT CONCRETE QUANTITY	
LOCATION	QUANTITY
NORTH ABUTMENT FOOTING (S.B. BRIDGE)	6.7
NORTH ABUTMENT FOOTING (N.B. BRIDGE)	6.8
<b>TOTAL (CU. YDS.)</b>	<b>13.5</b>

NOTE: CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

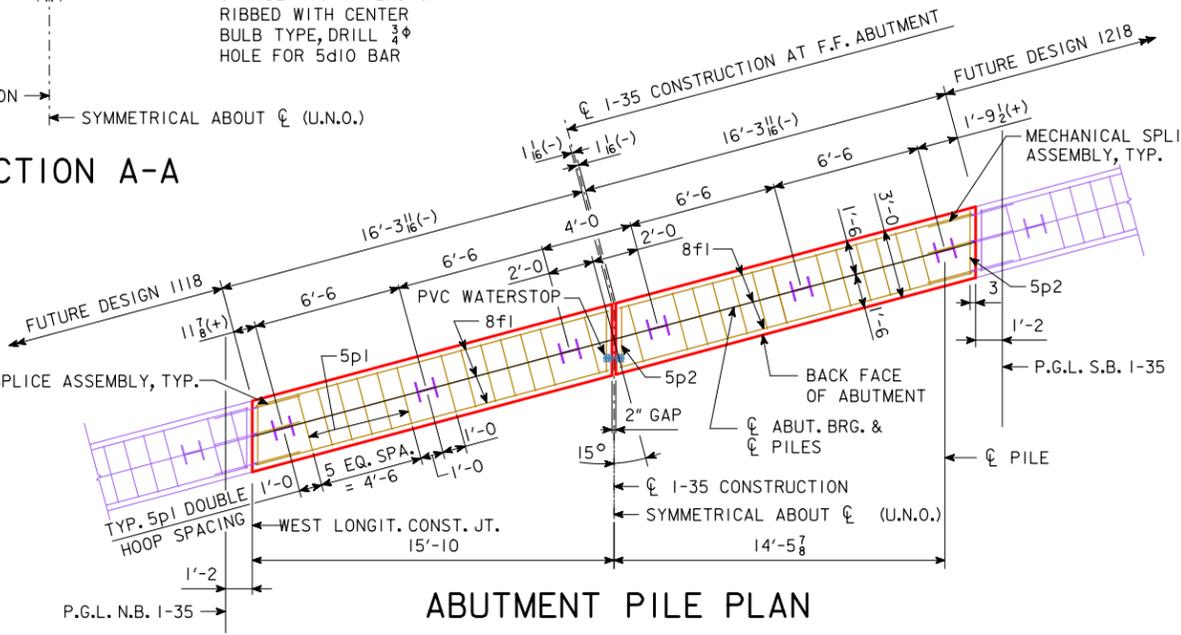
NOTES:  
 6 - HP 10 x 57 STEEL BEARING PILING REQUIRED AT SOUTH ABUTMENT (3 - S.B. BRIDGE, 3 - N.B. BRIDGE).

SEE DESIGN SHEET 20 FOR MECHANICAL SPLICE ASSEMBLY NOTES AND ABUTMENT PILE DRIVING NOTES.

DECK EDGE ARMORING NOT SHOWN FOR CLARITY. SEE DESIGN SHEET 16 FOR DETAILS.

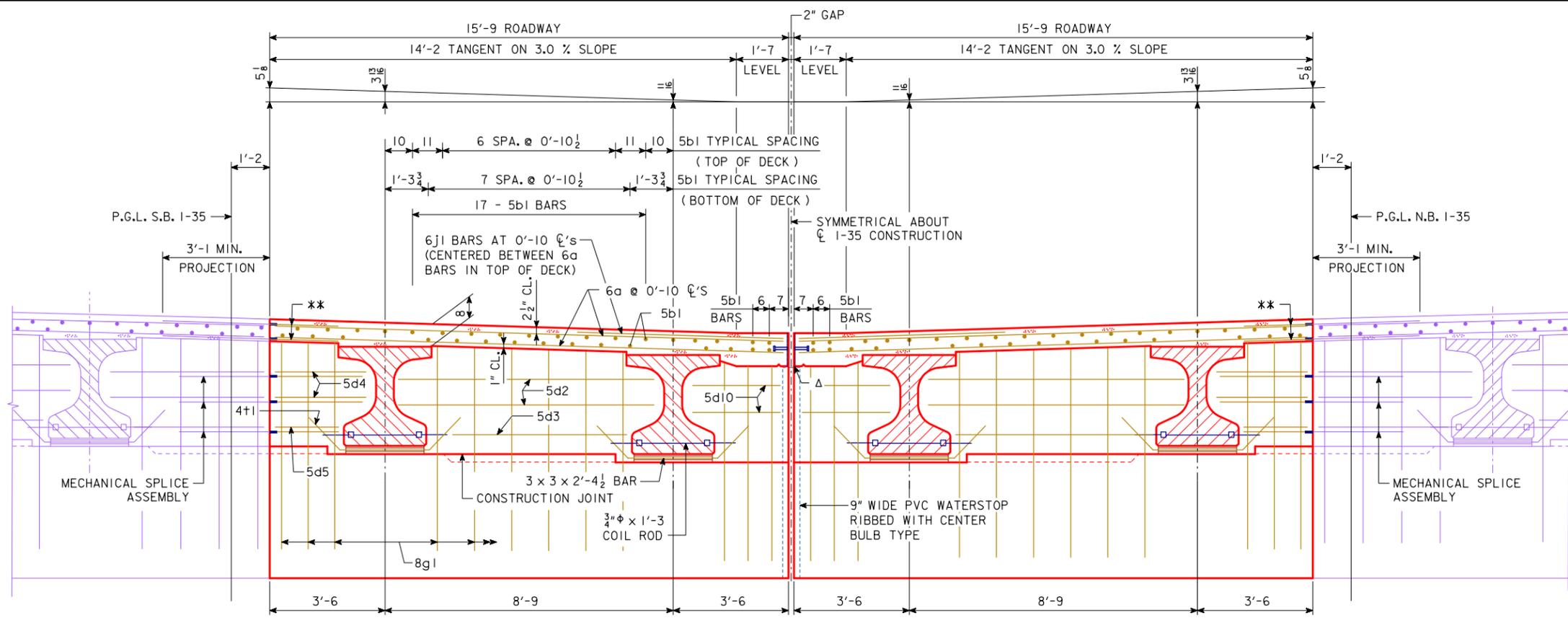
NOTE:  
 SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

ABUTMENT NOTES:  
 SEE DESIGN SHEET 12 FOR ABUTMENT NOTES.



ABUTMENT PILE PLAN

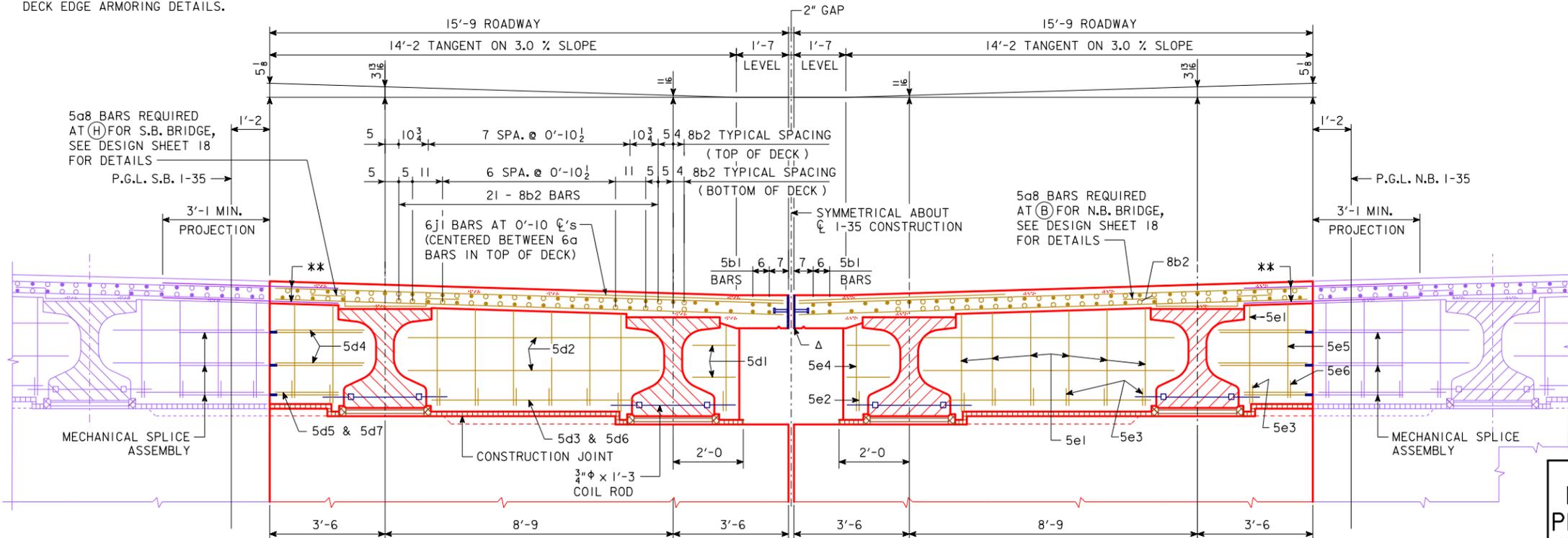
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**NORTH ABUTMENT PLAN/REAR ELEV.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 13 OF 29 FILE NO. 30541 DESIGN NO. 1018



**SECTION NEAR ABUTMENT**

NOTE: FOR DETAILS OF INTERMEDIATE DIAPHRAGMS SEE DESIGN SHEET 27.  
FOR LOCATION AND PLACEMENT OF PVC WATERSTOP SEE DESIGN SHEETS 12 AND 13.

△ SEE DESIGN SHEET 16 FOR DECK EDGE ARMORING DETAILS.



**SECTION NEAR PIER**

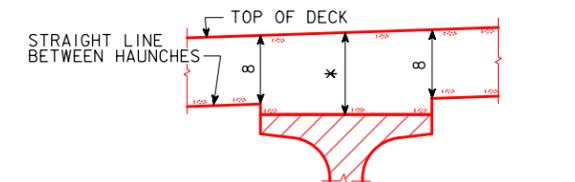
SEE DESIGN SHEET 20 FOR SUPERSTRUCTURE NOTES.

\*\* MECHANICAL SPLICE ASSEMBLY OR 6a7 STAINLESS STEEL BAR. SEE DESIGN SHEET 17 FOR LOCATIONS.

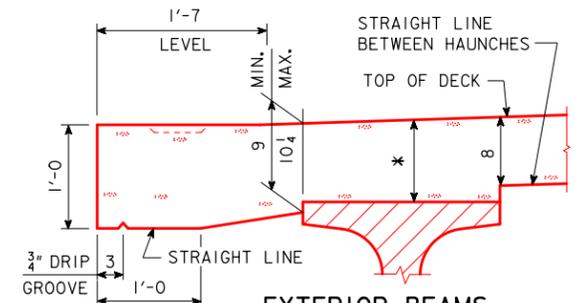
**TABLE OF APPROVED PVC WATERSTOPS**

MANUFACTURER	PRODUCT NO.
GREENSTREAK	696 OR 719
VINYLEX	RLB938
DURAJOINT CONCRETE ACCESSORIES	TYPE 7BR

**CONTRACTOR NOTE:**  
CAREFULLY LOCATE DECK BARS FOR FUTURE DOWELLED VERTICAL BARRIER RAIL REINFORCING. SPACING INDICATED IS INTENDED TO PREVENT INTERFERENCE WITH EXISTING LONGITUDINAL AND TRANSVERSE DECK REINFORCING.



**INTERIOR BEAMS**



**EXTERIOR BEAMS**

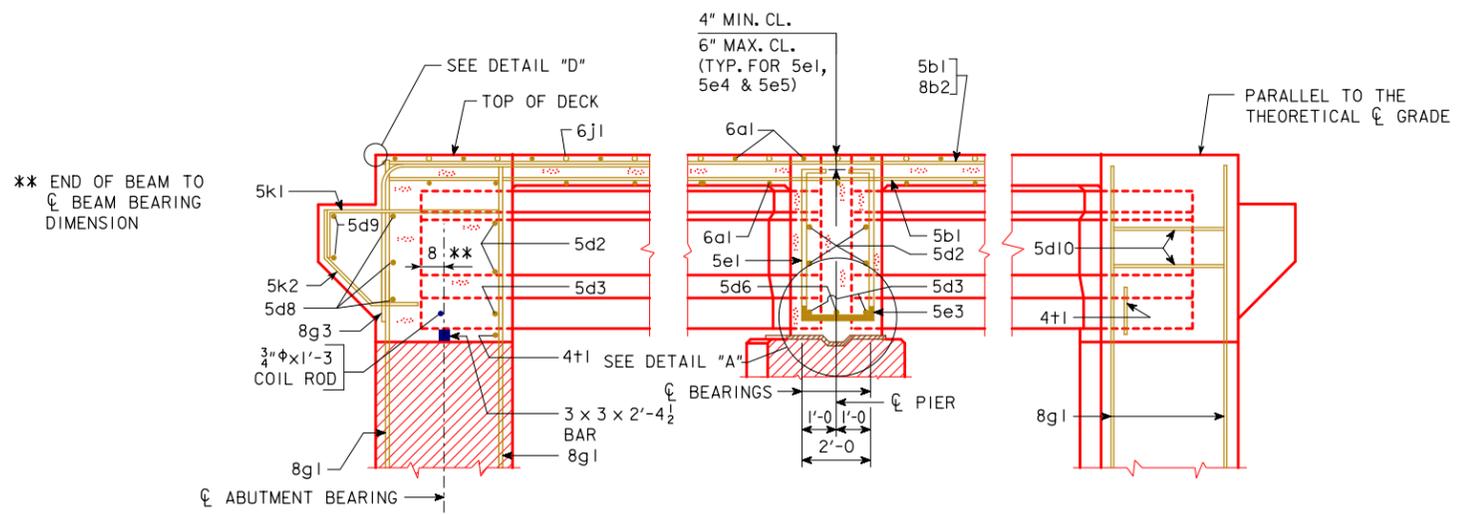
**TYPICAL DECK AND HAUNCH DETAIL**

\* FOR DECK THICKNESS OVER BEAMS SEE HAUNCH AND CAMBER DETAILS ON DESIGN SHEET 19.

DECK AREA = 11.16 SQ. FT. (N.B. BRIDGE).  
DECK AREA = 11.16 SQ. FT. (S.B. BRIDGE).  
DECK AREA DOES NOT INCLUDE THE HAUNCH.

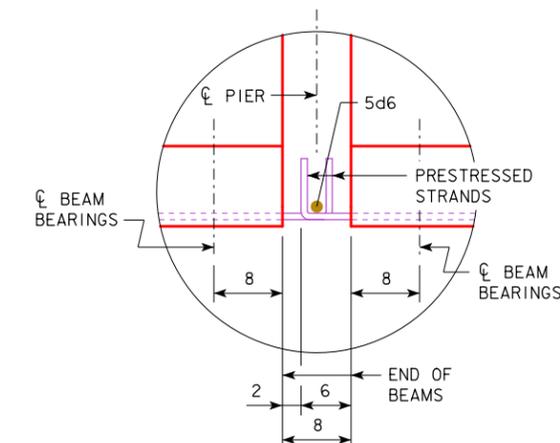
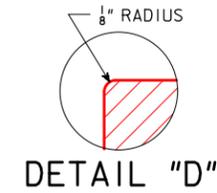
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**SUPERSTRUCTURE CROSS SECTIONS**  
STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 14 OF 29 FILE NO. 30541 DESIGN NO. 1018

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



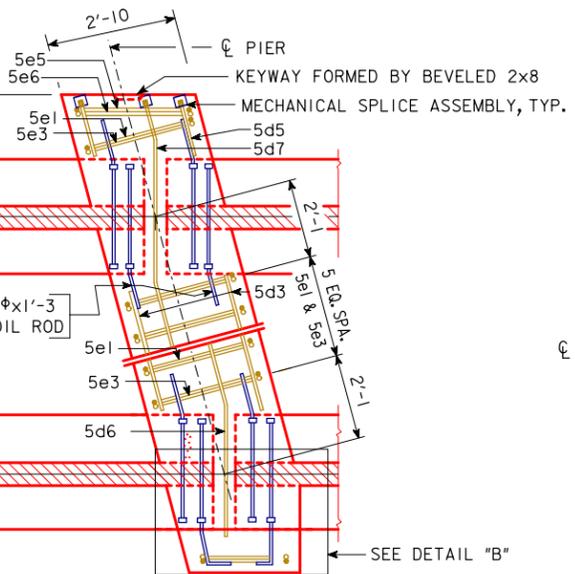
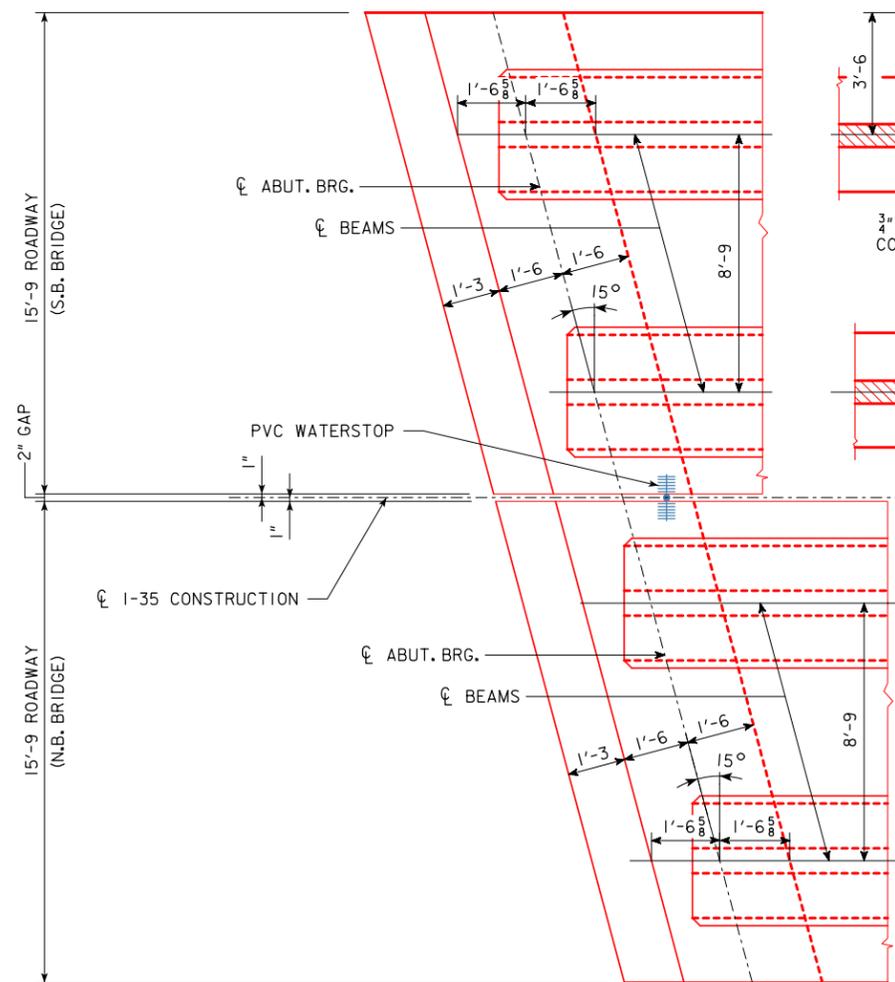
**PART LONGITUDINAL SECTION NEAR GUTTER**  
 (FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEET 27)

**PART END VIEW AT ABUTMENT**



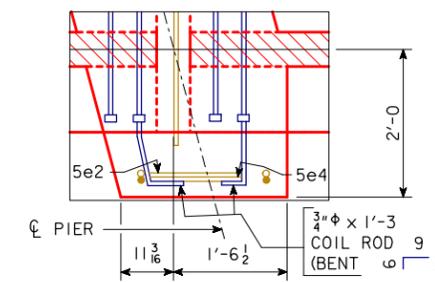
**DETAIL "A"**

NOTE: MATERIAL FOR NEOPRENE PADS TO BE OF 70 DUROMETER NEOPRENE.

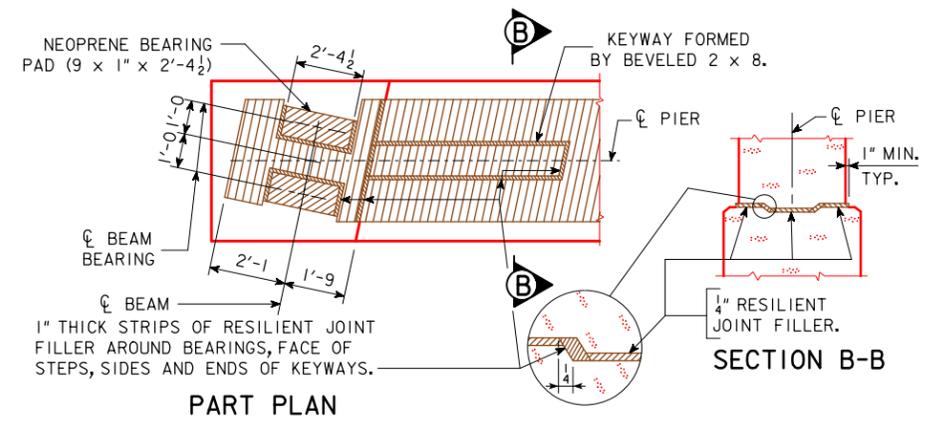


**PART SECTION AT PIER**

(SEE CROSS SECTION THRU DECK FOR NUMBER OF DIAPHRAGM HOOP BARS BETWEEN BEAMS)

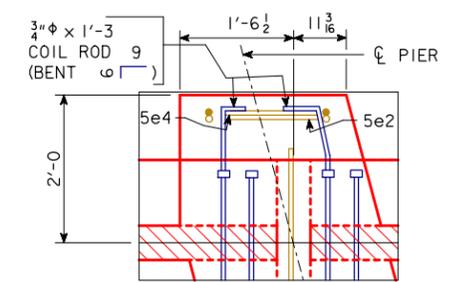


**DETAIL "B"**



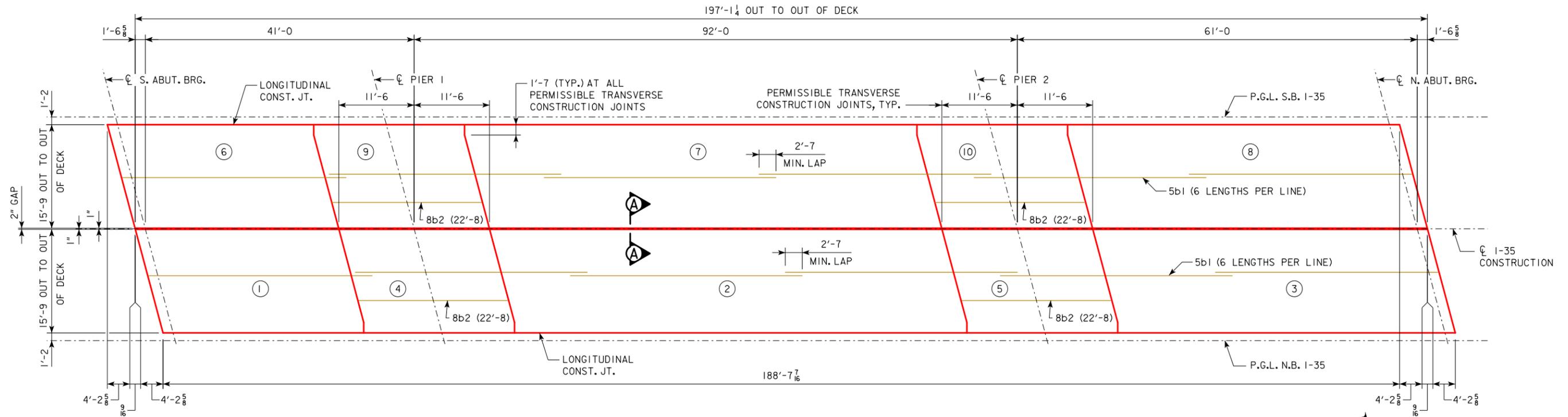
**TOP OF PIER DETAILS**

NOTE: SEE DESIGN SHEET 20 FOR MECHANICAL SPLICE ASSEMBLY DETAILS AND NOTES.  
 DECK EDGE ARMORING NOT SHOWN FOR CLARITY. SEE DESIGN SHEET 16 FOR DETAILS.



**DETAIL "C"**

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**LONGITUDINAL SECTION/PART PLAN**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 15 OF 29 FILE NO. 30541 DESIGN NO. 1018



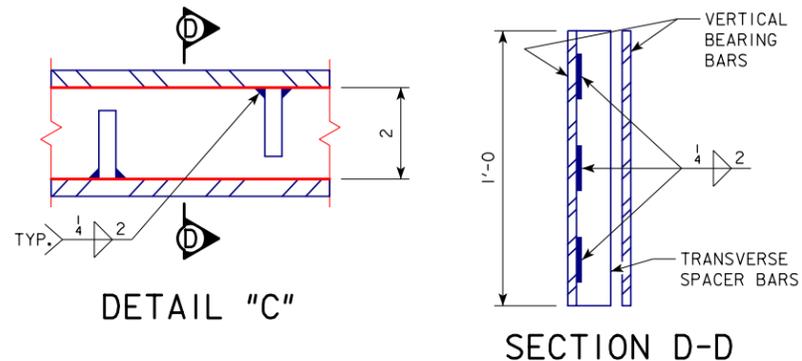
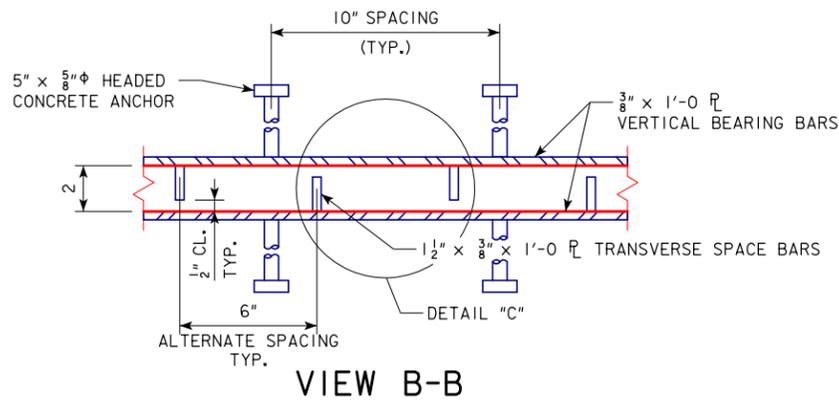
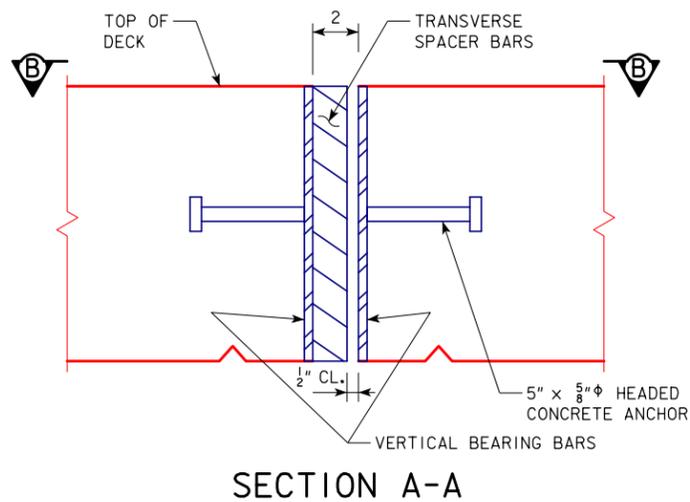
<b>STRUCTURAL STEEL</b>	
WEIGHT	7083 LBS.

### CONCRETE PLACEMENT DIAGRAM AND LONGITUDINAL REINFORCING STEEL LAYOUT

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

NOTE:  
STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

STRUCTURAL STEEL WEIGHT INCLUDES 394.2 FEET OF VERTICAL BEARING BARS, 394 TRANSVERSE SPACER BARS, 474 HEADED CONCRETE ANCHORS, AND 2364 2 INCH LONG WELDS.



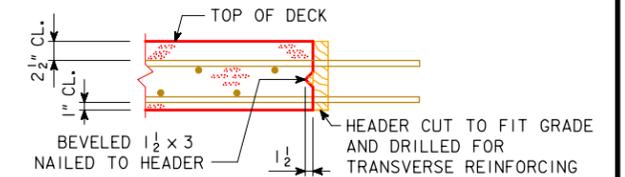
SECTION D-D

#### EDGE ARMORING NOTES:

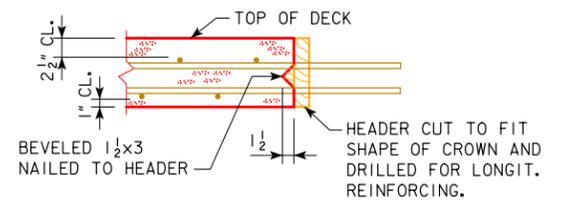
EDGE ARMORING PLATES SHALL BE FABRICATED FROM 3/8" STEEL PLATES USING 1/4" FILLET WELDS. THE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION. SHOP DRAWINGS OF THE EDGE ARMORING ASSEMBLIES SHALL BE SUBMITTED FOR APPROVAL. THE BID ITEM "STRUCTURAL STEEL" SHALL INCLUDE ALL COSTS ASSOCIATED WITH FABRICATING AND INSTALLING THE EDGE ARMORING AS PER PLAN. LONGITUDINAL DECK REINFORCING BARS SHALL BE SHIFTED AS NECESSARY TO ACCOMMODATE HEADED CONCRETE ANCHORS. ALL HEADED ANCHORS ARE TO BE 5/8" φ.

#### MATERIAL NOTES:

PLATES SHALL MEET THE REQUIREMENTS OF ASTM A709 GRADE 36. HEADED CONCRETE ANCHORS ARE TO BE OF AN APPROVED TYPE LISTED IN MATERIALS I.M. 453.10, APPENDIX A. THE FINISH ON EDGE ARMORING SHALL BE IN ACCORDANCE WITH THE PLAN NOTES AND SECTION 2408 OF THE STANDARD SPECIFICATIONS.

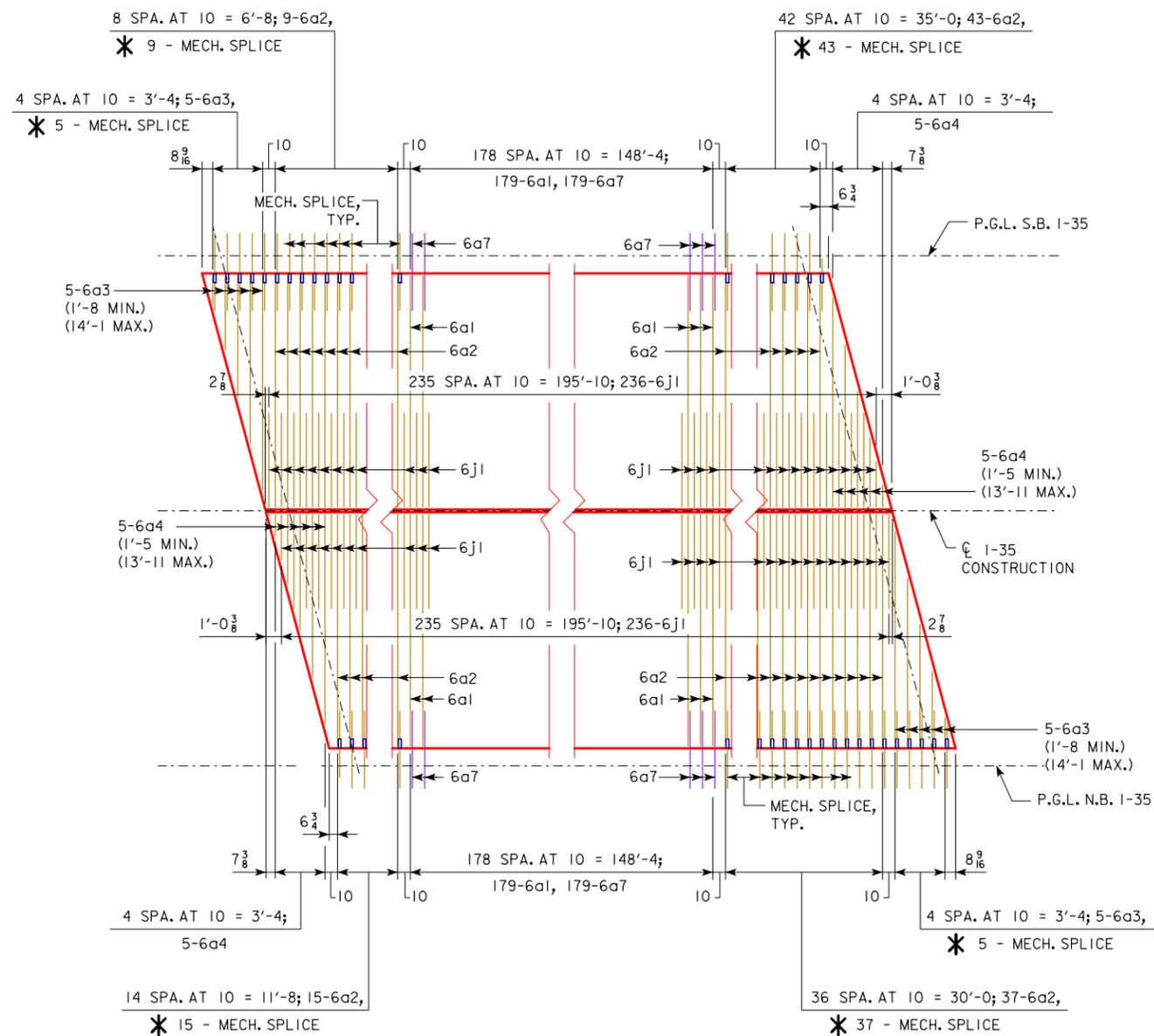


#### PERMISSIBLE LONGITUDINAL DECK CONSTRUCTION JOINT

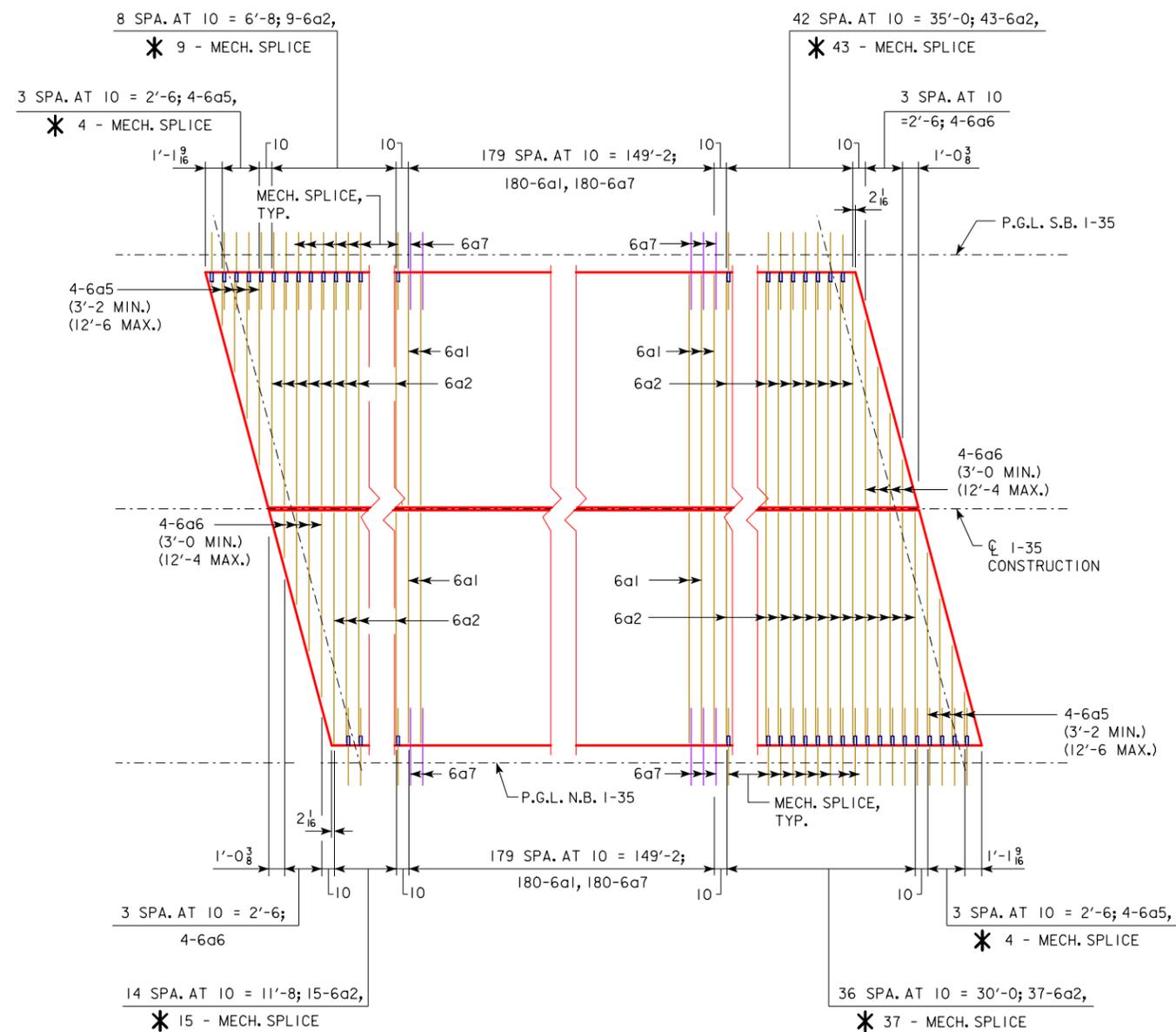


#### PERMISSIBLE TRANSVERSE DECK CONSTRUCTION JOINT

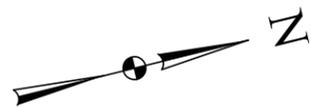
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**CONCRETE PLACEMENT/DECK REINF.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 16 OF 29 FILE NO. 30541 DESIGN NO. 1018



TOP OF DECK TRANSVERSE REINFORCING STEEL LAYOUT



BOTTOM OF DECK TRANSVERSE REINFORCING STEEL LAYOUT

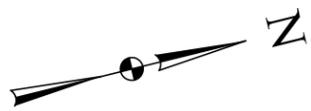


\* PROVIDE MECHANICAL SPLICE ASSEMBLIES WHERE TEMPORARY SHORING PREVENTS THE REQUIRED 3'-1 MINIMUM PROJECTION FOR 6a7 STAINLESS STEEL LAP BARS. CONTRACTOR MAY ADJUST NUMBER OF MECHANICAL SPLICE ASSEMBLIES AND STAINLESS STEEL BARS BASED ON TEMPORARY SHORING LIMITS. SEE DESIGN SHEET 20 FOR MECHANICAL SPLICE NOTES AND DETAILS.

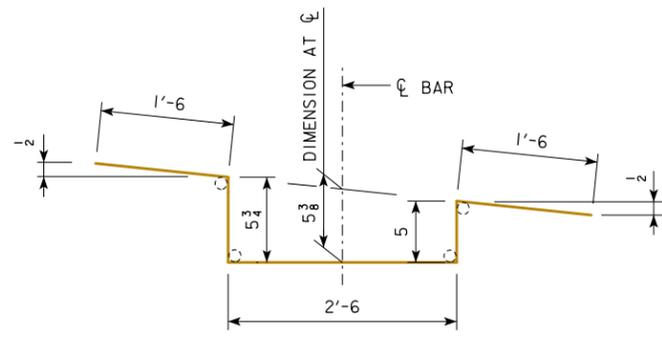
CONTRACTOR NOTE:  
CAREFULLY LOCATE DECK BARS FOR FUTURE DOWELLED VERTICAL BARRIER RAIL REINFORCING. SPACING INDICATED IS INTENDED TO PREVENT INTERFERENCE WITH EXISTING LONGITUDINAL AND TRANSVERSE DECK REINFORCING.

\* SEE DESIGN SHEET 20 FOR MECHANICAL SPLICE ASSEMBLY NOTES.

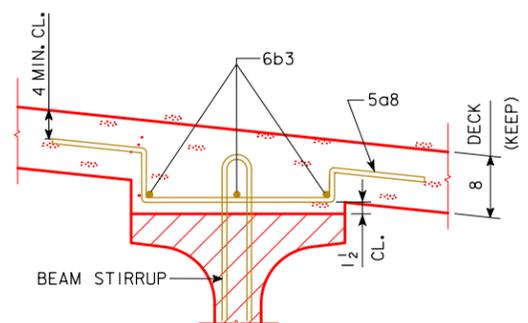
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**CONCRETE PLACEMENT/DECK REINF.**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 17 OF 29 FILE NO. 30541 DESIGN NO. 1018



**SUPPLEMENTAL HAUNCH REINFORCING**



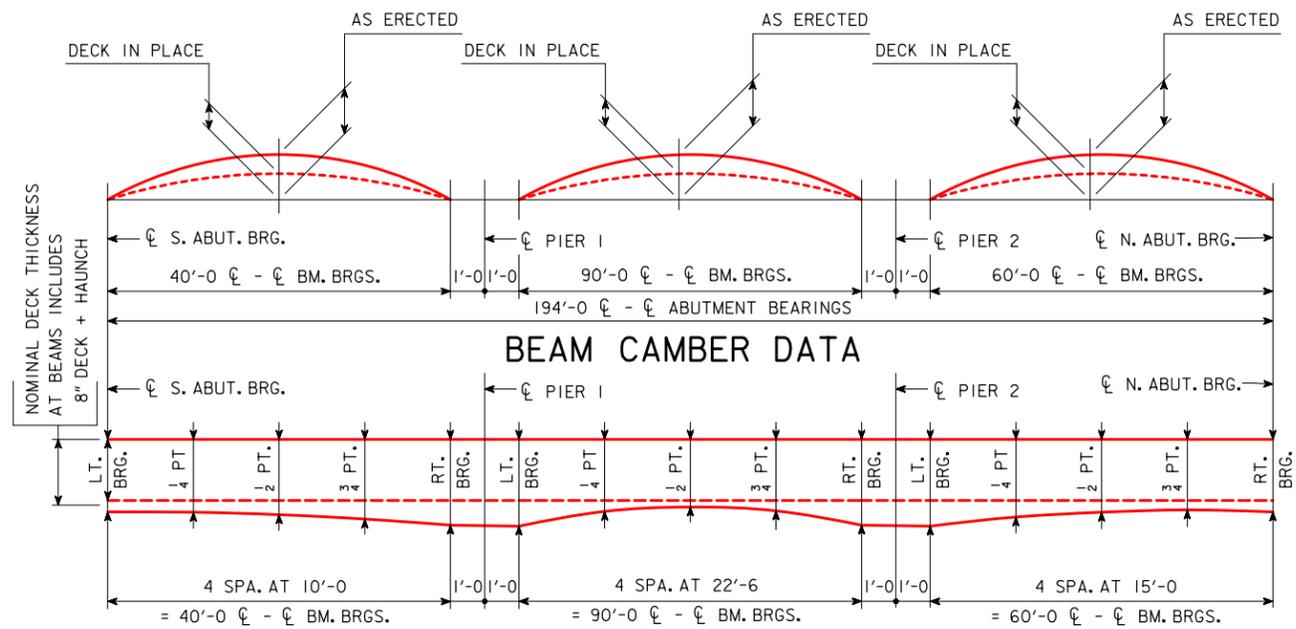
**TYPICAL 5a8  
LOOKING UPSTATION**



**SECTION THRU DECK HAUNCH**  
TYPICAL AT LOCATIONS INDICATED  
ON SUPPLEMENTAL HAUNCH REINFORCING LAYOUT.

NOTE:  
THE 5a8 BARS MAY BE TILTED AS NECESSARY TO FIT UNDER THE TOP OF  
DECK REINFORCING MAT AND MAINTAIN THE 4" MINIMUM DIMENSION SHOWN.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS      92'-0" INTERIOR SPAN  
**SUPPLEMENTAL HAUNCH REINFORCING**  
 STATION 329+91.45      (STAGE A)      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 18 OF 29      FILE NO. 30541      DESIGN NO. 1018

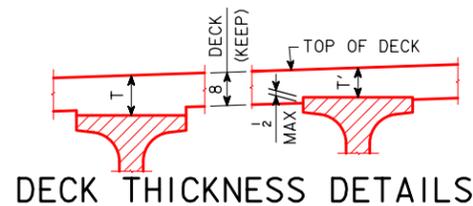


**BEAM CAMBER DATA**

BEAM LINE	SPAN 1		SPAN 2		SPAN 3	
	AS ERECTED	DECK IN PLACE	AS ERECTED	DECK IN PLACE	AS ERECTED	DECK IN PLACE
A & I	5/8	7/16	4 13/16	2 1/8	1 9/16	13/16
B & H	5/8	1/2	4 13/16	2 7/16	1 9/16	7/8

**DECK THICKNESS AT BEAMS (T)**

BEAM LINE	SPAN 1					SPAN 2					SPAN 3				
	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.
A & I	9 1/2	9 7/16	9 5/8	10 11/16	10 11/16	10 13/16	9 1/16	8 5/8	9	10 11/16	10 13/16	9 7/8	9 5/8	9 3/16	9 1/2
B & H	9 1/2	9 9/16	9 7/8	10 7/16	11 1/4	11 3/8	9 7/16	8 7/8	9 3/8	11 1/4	11 3/8	10 3/16	9 9/16	9 1/4	9 1/2



**DECK THICKNESS DETAILS**

NOTE: THE DECK THICKNESS (T) AT BEAMS IS BASED ON THE ANTICIPATED BEAM CAMBER AND DEFLECTIONS. THESE VALUES ARE USED BY THE DESIGNER TO SET BEAM ELEVATIONS AND ESTIMATE CONCRETE QUANTITIES. REFER TO THE HAUNCH DATA DETAILS SHEET FOR ADDITIONAL INFORMATION TO AID THE CONTRACTOR IN SETTING THE FIELD HAUNCHES REQUIRED FOR CONSTRUCTION.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS      92'-0" INTERIOR SPAN  
**DECK THICKNESS DETAILS**  
 STATION 329+91.45      (STAGE A)      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 19 OF 29      FILE NO. 30541      DESIGN NO. 1018

### SOUTH ABUTMENT PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 75 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 123 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWNDRAG LOAD OF 3 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 97 TONS AT END OF DRIVE. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

### NORTH ABUTMENT PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 100 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 162 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWNDRAG LOAD OF 20 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 134 TONS AT END OF DRIVE. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

### SUPERSTRUCTURE NOTES:

THE BRIDGE DECK AS SHOWN IN DESIGN SHEET 14 INCLUDES 1/2" INTEGRAL WEARING SURFACE.

THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE BRIDGE DECK.

COST OF ALL RESILIENT JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".

ALL BEAMS ARE TO BE SET VERTICAL.

FORMS FOR THE DECK AND BARRIER RAIL ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

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

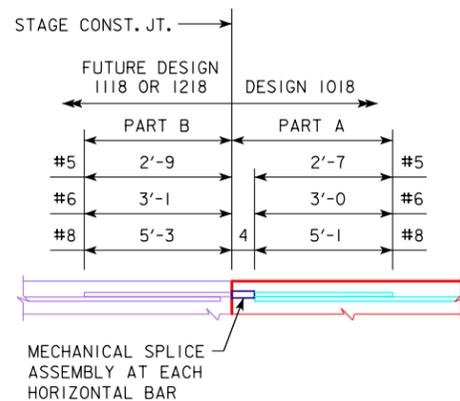
ALL DECK AND DIAPHRAGM REINFORCING IS TO BE WIRED IN PLACE AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED.

TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF DECK. BOTTOM TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF DECK. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR DECK BOLSTERS SPACED 4'-0" APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND DECK BOLSTERS.

COST OF BEARING MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

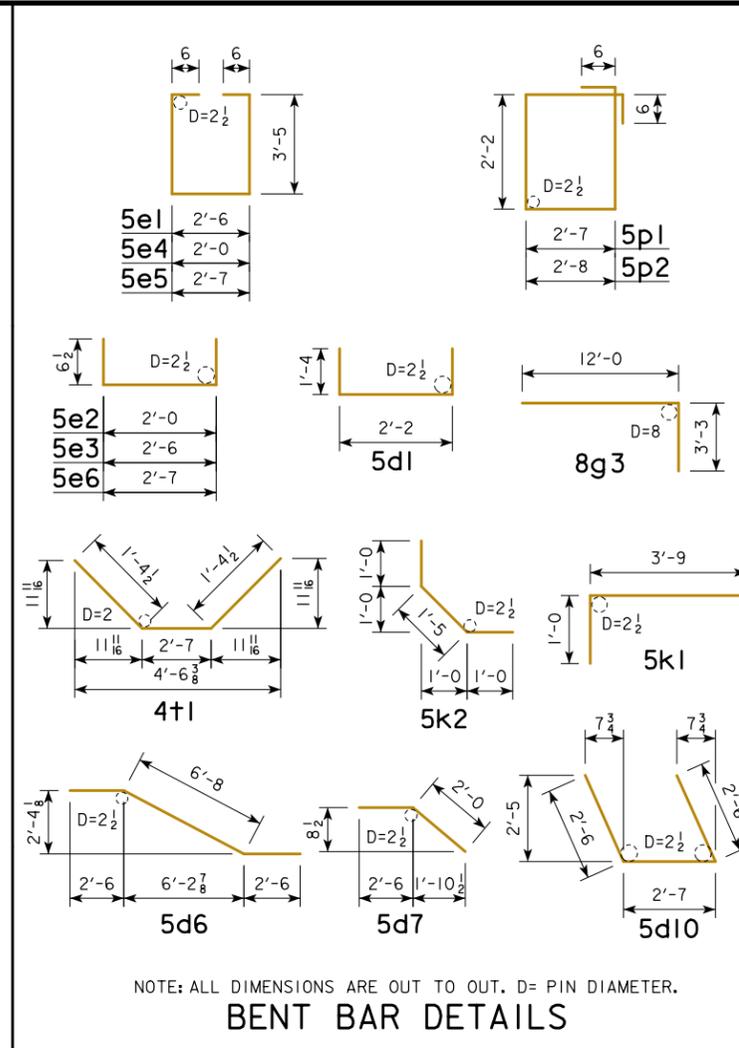
THE 8f1 BARS IN THE ABUTMENT FOOTING, THE 5d4, 5d5, 5d7, 5d8 AND 5d9 BARS IN THE PIER AND ABUTMENT DIAPHRAGMS, AND THE 6a2, 6a3, AND 6a5 BARS IN THE DECK, SHALL BE SPLICED AT THE STAGE CONSTRUCTION JOINT USING MECHANICAL SPLICE ASSEMBLIES. MECHANICAL SPLICE ASSEMBLIES CONSIST OF MECHANICAL SPLICERS AND REINFORCING SPLICE BARS AS REQUIRED TO FACILITATE THE USE OF THE MECHANICAL SPLICER. THE MECHANICAL SPLICE ASSEMBLY USED SHALL MEET THE REQUIREMENTS OF MATERIALS IN 451 APPENDIX E. REINFORCING SPLICE BARS SHALL MATCH SIZE OF BAR TO BE SPLICED.

THE COST OF ALL SPLICE ASSEMBLIES IS TO BE INCLUDED IN THE PRICE BID FOR "REINFORCING STEEL, EPOXY COATED" AND NO SEPARATE PAYMENT WILL BE MADE. THE WEIGHT OF MECHANICAL SPLICE ASSEMBLIES IS NOT INCLUDED IN THE QUANTITY SHOWN FOR "REINFORCING STEEL, EPOXY COATED". A TOTAL OF 36 - #8 ABUTMENT FOOTING (18 - S.B. BRIDGE, 18 - N.B. BRIDGE), 60 - #5 PIER AND ABUTMENT DIAPHRAGM (30 - S.B. BRIDGE, 30 - N.B. BRIDGE), AND 226 - #6 DECK (113 - S.B. BRIDGE, 113 - N.B. BRIDGE), SPLICE ASSEMBLIES WILL BE REQUIRED.



DETAIL OF MECHANICAL SPLICE ASSEMBLIES

MECHANICAL SPLICE ASSEMBLY PART A INSTALLED IN DESIGN 1018. MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118 OR 1218. SEE GENERAL NOTES SHEET FOR ADDITIONAL NOTES.



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

### BENT BAR DETAILS

### CONCRETE PLACEMENT QUANTITIES

LOCATION	QUANTITY
SECTION 1, DECK & ABUT. DIAPH., N.B. BRIDGE	20.5
SECTION 2, DECK, N.B. BRIDGE	30.8
SECTION 3, DECK & ABUT. DIAPH., N.B. BRIDGE	29.3
SECTION 4, DECK & PIER DIAPH., N.B. BRIDGE	14.4
SECTION 5, DECK & PIER DIAPH., N.B. BRIDGE	14.4
SECTION 6, DECK & ABUT. DIAPH., S.B. BRIDGE	20.5
SECTION 7, DECK, S.B. BRIDGE	30.8
SECTION 8, DECK & ABUT. DIAPH., S.B. BRIDGE	29.3
SECTION 9, DECK & PIER DIAPH., S.B. BRIDGE	14.4
SECTION 10, DECK & PIER DIAPH., S.B. BRIDGE	14.4
<b>TOTAL (CU. YDS.)</b>	<b>218.8</b>

NOTE:  
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

△ SEE DESIGN SHEET 18 FOR 5a8 BENT BAR DETAILS.

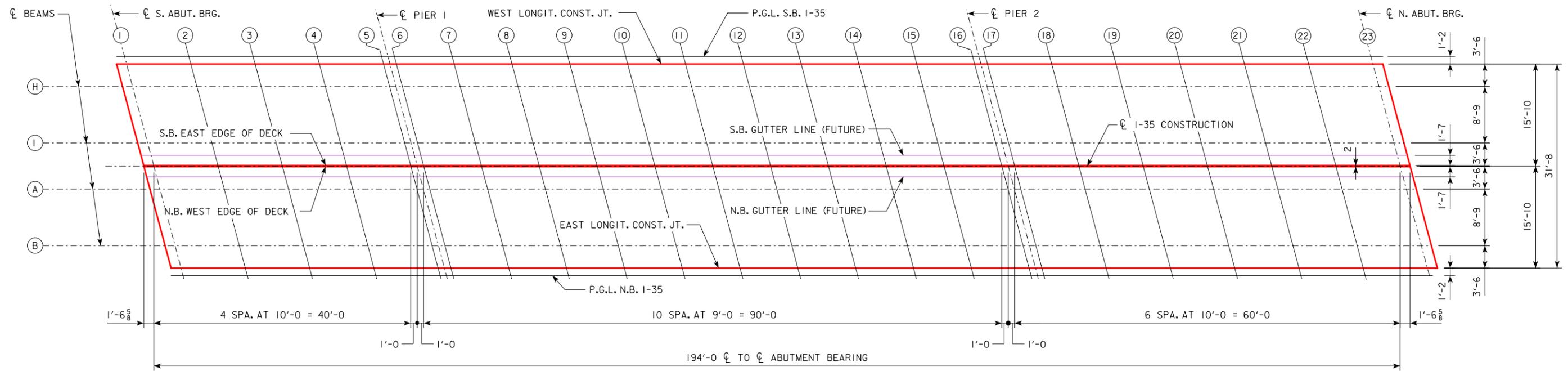
### REINFORCING BAR LIST

(S.B. BRIDGE AND N.B. BRIDGE INCLUDED)

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	DECK TRANSV. TOP & BOTT.	—	718	15'-5"	16,626
6a2	DECK TRANSV. TOP & BOTT.	—	208	15'-3"	4764
6a3	DECK TRANSV. TOP ENDS	—	10	VARIABLES	118
6a4	DECK TRANSV. TOP ENDS	—	10	VARIABLES	115
6a5	DECK TRANSV. BOTT. ENDS	—	8	VARIABLES	94
6a6	DECK TRANSV. BOTT. ENDS	—	8	VARIABLES	92
5a8	DECK TRANSV. HAUNCH, BMS H (S.B.), B (N.B.)	—	124	6'-5"	830
5b1	DECK LONGIT. TOP & BOTT.	—	396	35'-0"	14,456
8b2	DECK LONGIT. TOP AT PIERS	—	124	22'-8"	7054
6b3	DECK LONGIT. HAUNCH, BMS H (S.B.), B (N.B.)	—	12	30'-0"	541
5d1	PIER DIAPH. ENDS	—	8	4'-10"	40
5d2	PIER & ABUT. DIAPH LONGIT.	—	24	7'-10"	196
5d3	PIER & ABUT. DIAPH LONGIT.	—	12	5'-11"	74
5d4	PIER & ABUT. DIAPH LONGIT.	—	24	2'-10"	71
5d5	PIER & ABUT. DIAPH LONGIT.	—	12	1'-8"	21
5d6	PIER DIAPH. LONGIT.	—	4	11'-8"	49
5d7	PIER DIAPH. LONGIT. ENDS	—	4	4'-6"	19
5d8	ABUT. DIAPH. LONGIT. B.F.	—	12	15'-10"	198
5d9	PAVING NOTCH LONGIT.	—	8	15'-10"	190
5d10	ABUT. DIAPH. ENDS	—	8	7'-7"	63
5e1	PIER DIAPH. HOOPS	—	28	10'-4"	302
5e2	PIER DIAPH. TIES ENDS	—	4	3'-1"	13
5e3	PIER DIAPH. TIES	—	28	3'-7"	105
5e4	PIER DIAPH. HOOPS ENDS	—	4	9'-10"	41
5e5	PIER DIAPH. HOOPS	—	4	10'-5"	43
5e6	PIER DIAPH. TIES	—	4	3'-8"	15
8f1	ABUT. FOOTING LONGIT. BOTH F.	—	36	15'-10"	1522
8g1	ABUT. VERT. BOTH F.	—	120	6'-10"	2189
8g3	ABUT. DIAPH. VERT. B.F.	—	68	15'-3"	2769
6j1	TOP OF DECK TRANSV. (AT RAIL)	—	472	6'-3"	4431
5k1	PAVING NOTCH	—	68	4'-9"	337
5k2	PAVING NOTCH	—	68	3'-5"	242
5p1	ABUT. HOOPS	—	104	10'-6"	1139
5p2	ABUT. HOOPS AT ENDS	—	16	10'-8"	178
4f1	UNDER BEAMS AT ABUTMENTS	—	8	5'-4"	29
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					59,358
6a7	DECK TRANSV. TOP & BOTT., LAP	—	718	6'-3"	6740
REINFORCING STAINLESS STEEL - TOTAL (LBS.)					6740
#2	PILE SPIRAL	—	12	38'-6"	77
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70	—	36	1'-10"	46
REINFORCING STEEL - TOTAL (LBS.)					123

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**DECK, ABUT. & DIAPH. QUANTITIES**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 20 OF 29 FILE NO. 30541 DESIGN NO. 1018

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



TOP OF DECK ELEVATION LOCATIONS

TOP OF DECK ELEVATIONS

LINE NUMBER	CL S. ABUT. BEARING				CL PIER 1 BEARINGS										CL PIER 2 BEARINGS				CL N. ABUT. BEARING				
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18		LINE 19	LINE 20	LINE 21	LINE 22
WEST LONGIT. CONST. JT.	906.14	906.19	906.25	906.31	906.36	906.38	906.43	906.48	906.53	906.58	906.63	906.69	906.74	906.79	906.84	906.89	906.90	906.96	907.02	907.08	907.13	907.19	907.25
S.B. BEAM LINE H	906.04	906.09	906.15	906.21	906.27	906.28	906.33	906.38	906.43	906.48	906.54	906.59	906.64	906.69	906.74	906.79	906.80	906.86	906.92	906.98	907.03	907.09	907.15
S.B. BEAM LINE I	905.79	905.84	905.90	905.96	906.02	906.03	906.08	906.13	906.18	906.23	906.29	906.34	906.39	906.44	906.49	906.54	906.56	906.61	906.67	906.73	906.79	906.84	906.90
S.B. GUTTER LINE (FUTURE)	905.73	905.79	905.85	905.90	905.96	905.97	906.02	906.08	906.13	906.18	906.23	906.28	906.33	906.39	906.44	906.49	906.50	906.56	906.62	906.67	906.73	906.79	906.85
N.B. GUTTER LINE (FUTURE)	905.74	905.79	905.85	905.91	905.97	905.98	906.03	906.08	906.13	906.18	906.24	906.29	906.34	906.39	906.44	906.49	906.51	906.56	906.62	906.68	906.74	906.79	906.85
N.B. BEAM LINE A	905.80	905.86	905.91	905.97	906.03	906.04	906.09	906.14	906.19	906.25	906.30	906.35	906.40	906.45	906.50	906.56	906.57	906.62	906.68	906.74	906.80	906.85	906.91
N.B. BEAM LINE B	906.07	906.13	906.19	906.25	906.30	906.31	906.37	906.42	906.47	906.52	906.57	906.62	906.68	906.73	906.78	906.83	906.84	906.90	906.96	907.01	907.07	907.13	907.19
EAST LONGIT. CONST. JT.	906.18	906.24	906.30	906.36	906.41	906.43	906.48	906.53	906.58	906.63	906.68	906.74	906.79	906.84	906.89	906.94	906.95	907.01	907.07	907.13	907.18	907.24	907.30

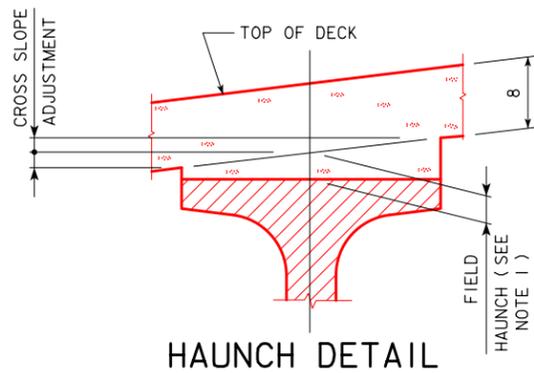
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**TOP OF DECK ELEVATIONS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 21 OF 29 FILE NO. 30541 DESIGN NO. 1018

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

BEAM LINE	☐ S. ABUT. BEARING				☐ PIER 1 BEARINGS										☐ PIER 2 BEARINGS				☐ N. ABUT. BEARING				
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23
H (S.B.)	905.37	905.43	905.50	905.55	905.60	905.61	905.72	905.83	905.92	906.00	906.06	906.11	906.13	906.14	906.14	906.13	906.14	906.22	906.30	906.36	906.42	906.45	906.48
I (S.B.)	905.12	905.19	905.25	905.30	905.35	905.36	905.48	905.60	905.70	905.78	905.84	905.88	905.90	905.91	905.90	905.88	905.89	905.98	906.06	906.12	906.17	906.21	906.23
A (N.B.)	905.13	905.20	905.26	905.31	905.36	905.37	905.49	905.61	905.71	905.79	905.85	905.89	905.91	905.92	905.91	905.89	905.90	905.99	906.07	906.13	906.18	906.22	906.24
B (N.B.)	905.41	905.47	905.53	905.59	905.64	905.65	905.76	905.87	905.96	906.04	906.10	906.15	906.17	906.18	906.17	906.16	906.18	906.26	906.34	906.40	906.45	906.49	906.52

	BEAM LINE	☐ S. ABUT. BEARING				☐ PIER 1 BEARINGS										☐ PIER 2 BEARINGS				☐ N. ABUT. BEARING				
		LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23
ANTICIPATED DEFLECTION DUE TO DECK (IN.)	H (S.B.) & B (N.B.)	0	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	0	0	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{1}{4}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{4}$	0	0	$\frac{5}{16}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{9}{16}$	$\frac{5}{16}$	0
	I (S.B.) & A (N.B.)	0	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	0	0	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{2}{16}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	0	0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{8}$	0
CROSS SLOPE ADJUSTMENTS (IN.)	ALL	$\frac{1}{2}$																						
ALLOWABLE FIELD HAUNCH (IN. & FT.)	MAX.	ALL	3 $\frac{1}{2}$ (0.292)			3 $\frac{1}{2}$ (0.292)			2 $\frac{1}{2}$ (.208)							3 $\frac{1}{2}$ (0.292)			3 (0.250)			3 $\frac{1}{2}$ (0.292)		
	MIN.	ALL	$\frac{1}{2}$ (0.042)			0 (0.001)			$\frac{1}{2}$ (0.042)			0 (0.001)							$\frac{1}{2}$ (0.042)			0 (0.001)		

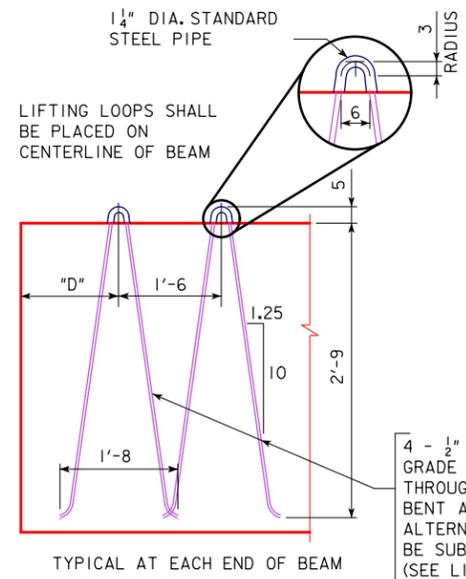
**NOTE:**  
 HAUNCH LOCATIONS ARE AT THE SAME LOCATION AS THE ENCIRCLED LETTERS AND NUMBERS SHOWN ON DECK ELEVATIONS SHEET.



**NOTE:**  
 BRIDGE SEAT ELEVATIONS ARE SET BASED ON THEORETICAL CAMBER AND BEAM DEFLECTIONS. THESE BRIDGE SEATS WILL PROVIDE A THEORETICAL BEAM HAUNCH WITHIN DESIGN PARAMETERS. FIELD HAUNCHES ARE DETERMINED USING SURVEYED TOP OF BEAM ELEVATIONS AND "BEAM LINE HAUNCH ELEVATION" DATA. ALLOWABLE MAXIMUM AND MINIMUM "FIELD HAUNCH" VALUES ARE GIVEN IN INCHES AND DECIMALS OF FEET IN THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE.

**NOTE 1:**  
 TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACINGS SHOWN ON THE "TOP OF DECK ELEVATIONS LAYOUT". SUBTRACT THE SURVEYED BEAM SHOT FROM THE "BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE "FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES ADJUSTMENTS FOR DECK THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS SHOWN IN INCHES AND DECIMALS OF FEET IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS      92'-0" INTERIOR SPAN  
**DECK HAUNCH DATA DETAILS**  
 STATION 329+91.45      (STAGE A)      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 22 OF 29      FILE NO. 30541      DESIGN NO. 1018



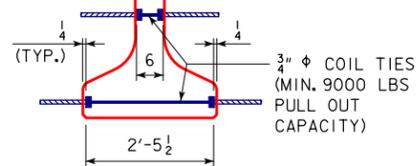
LIFTING LOOP DETAIL

LIFTING LOOP AND OVERHANG TABLE				
BEAMS	LIFTING LOOPS EACH END	# OF STRANDS PER LOOP	D	BEAM OVERHANG (FT)
BTB40	1	4	2'-0	**
BTB60	2	4	2'-0	8
BTB90	2	4	2'-6	9

\*\* IN ACCORDANCE WITH ARTICLE 2407.03,K OF THE STANDARD SPECIFICATIONS.

LIFTING LOOPS SHALL CARRY LOADS EQUALLY.

NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.



COIL TIE DETAIL

ΔΔ 5b1, 5b5 AND 6b3 BARS TO BE EPOXY COATED  
 \* 6b3 AND 6b4 BARS TO BE USED IN PAIRS

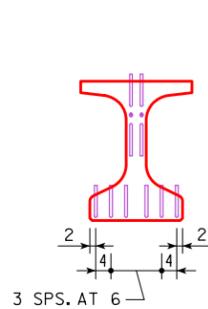
REINFORCING BAR LIST							
BEAM	BTB40	BTB60	BTB90				
BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
5a1		6	41'-1	12	31'-8	12	27'-9
5a2						6	40'-0
ΔΔ 5b1						69	7'-8
ΔΔ * 6b3		36	4'-4	36	4'-4	32	4'-4
* 6b4		4	3'-7	4	3'-7	16	3'-7
ΔΔ 5b5		25	7'-9	43	7'-9		
4c1		55	2'-7	77	2'-7	109	2'-7
4d1		45	6'-5	63	6'-5	91	6'-5
4e1		24	3'-2	24	3'-2	26	3'-2
4h1		4	8'-0	4	8'-0	4	8'-0

**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. PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 270.

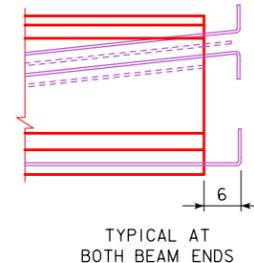
**SPECIFICATIONS:**

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.  
 DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

THE TOP AND BOTTOM FOR 2 ROWS OR THE TOP AND 3rd ROWS OF DEFLECTED STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS WHICH ARE TO BE SHOP BENT AS SHOWN. THE SECOND ROW IS TO BE CUT WITH A 5" PROJECTION AND THE REMAINING TOP DEFLECTED STRANDS IN ROWS 4 AND BELOW ARE TO BE CUT FLUSH WITH BEAM FACE. SIX BOTTOM STRANDS ARE TO BE CUT WITH 1'-6 PROJECTIONS WHICH ARE TO BE SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS ARE TO BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



**BTB BEAM DATA**

BTB BEAM	SPAN LENGTH @ BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH		STRAND SIZE (in)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS kips	HOLD DOWN FORCE-kips	CAMBER (in)		DEFLECTION (in) Δ <sub>b</sub>		PERMISSIBLE MAXIMUM SPACING	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (WEIGHT-LBS)
			f'ci (ksi)	f'c (ksi)		STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE (ELASTIC) Δ <sub>i</sub>	TIME (PLASTIC) Δ <sub>T</sub>				
			STEEL DIAPHRAGM	STEEL DIAPHRAGM		HL-93 LOADING											
BTB40	40'-0	41'-4	4.5	5.0	0.60	12	1	510		0.34	0.61	0.14	0.03	9'-3	13.6	6.7	1075
BTB60	60'-0	61'-4	4.5	5.0	0.60	16	2	765	8.6	0.88	1.56	0.65	0.16	9'-3	20.2	10.0	1475
BTB90	90'-0	91'-4	7.5	8.5	0.60	30	8	1616	18.6	2.71	4.81	2.46	0.62	9'-3	30.0	14.8	2097

- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF DECK AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A DECK (8 in) AND HAUNCH (1.5 in) WEIGHT OF: 0.98 kips/ft for 9'-3 BEAM SPACING AND ONE STEEL DIAPHRAGM (0.500 kips) AT ℄ OF SPAN. FOR DIFFERENT DECK AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF DECK AND SHRINKAGE OF DECK. TOTAL BEAM DEFLECTIONS AT ℄ OF SPAN, Δ<sub>b</sub>, DUE TO WEIGHT OF DECK AND DIAPHRAGMS FOR DETAILING PURPOSE: (A) Δ<sub>b</sub> = Δ<sub>i</sub> + Δ<sub>T</sub> FOR SIMPLE SPAN. (B) Δ<sub>b</sub> = Δ<sub>i</sub> + 3/4 Δ<sub>T</sub> FOR END SPANS OF CONTINUOUS BRIDGE. (C) Δ<sub>b</sub> = Δ<sub>i</sub> + 1/2 Δ<sub>T</sub> FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's = 270 ksi. AND A<sub>s</sub> = 0.217 in<sup>2</sup>.

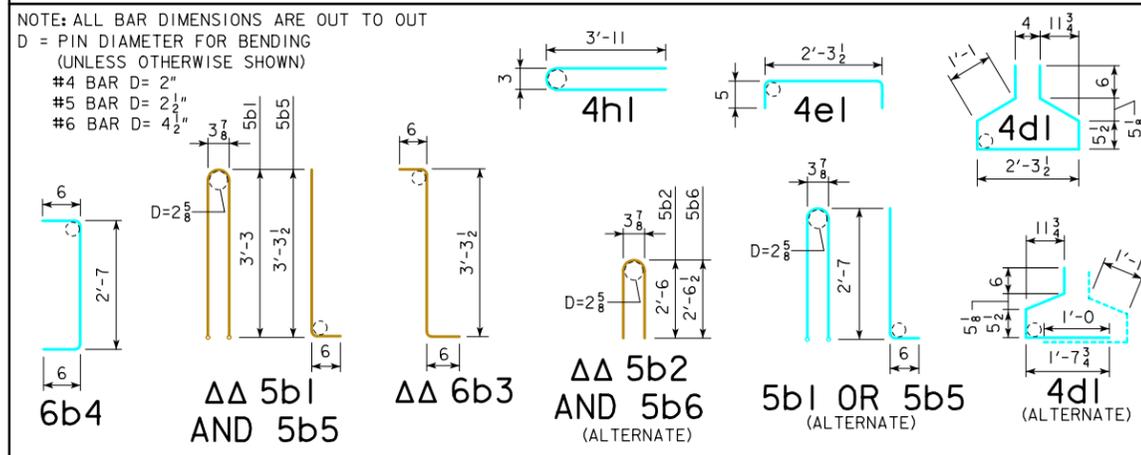
CALCULATED DESIGN CAMBERS HAVE BEEN REDUCED FROM THEIR THEORETICAL VALUES BY 15% TO AID CONSTRUCTABILITY.

**BEAM NOTES:**

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LBS PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE. ALL PPC BEAMS SHALL USE HIGH PERFORMANCE CONCRETE (HPC) IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION. ALL PRESTRESSING STRANDS EXCEPT LIFTING LOOP STRANDS SHALL BE 0.60 IN. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 in<sup>2</sup>) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 kips. TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570. BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER. THE PORTIONS OF THE PRESTRESSED BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS. ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE. FOR TRANSPORTING, THE ALLOWABLE OVERHANG IS SHOWN IN THE LIFTING LOOP AND OVERHANG TABLE. HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET. MINIMUM CONCRETE f'c (AT 28 DAYS) AND MINIMUM f'ci AT RELEASE ARE LOCATED IN THE BTB BEAM DATA TABLE ABOVE. FOUR 0.60 IN. DIAMETER STRANDS STRESSED TO NOT MORE THAN 5000 LBS EACH MAY BE USED IN LIEU OF BARS 5a1 AND 5a2 IN THE TOP FLANGE.

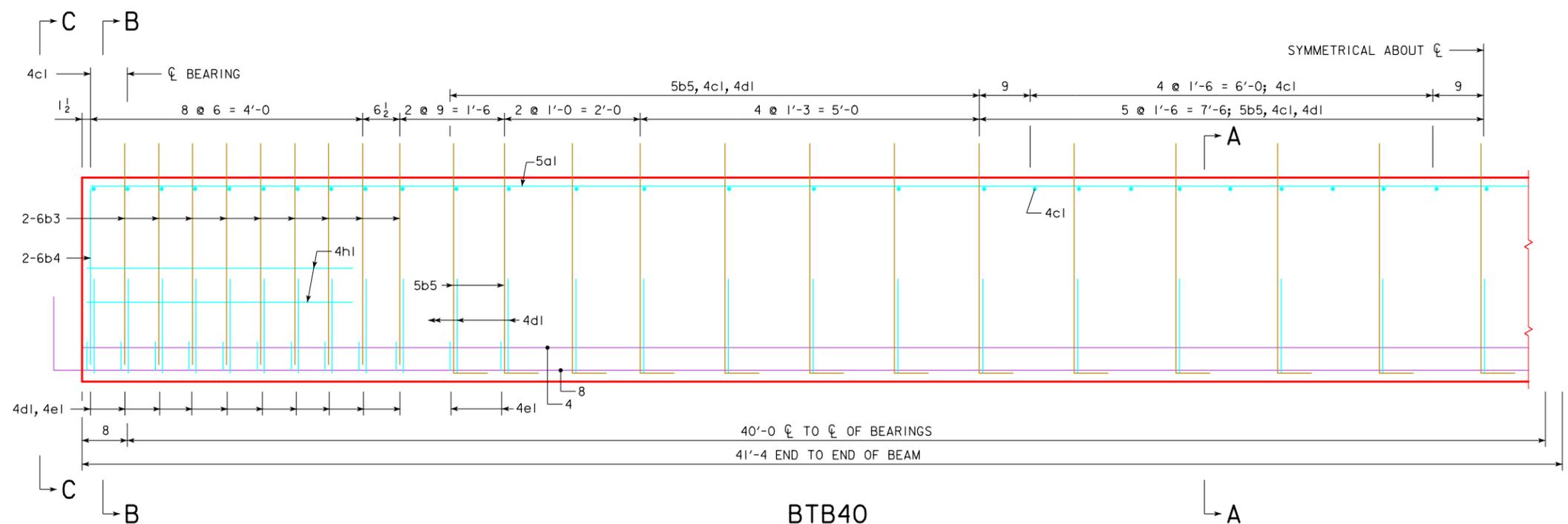
NOTE: FOR MODIFIED STIRRUP EXTENSIONS, SEE BENT BAR DETAILS AND BEAM DETAIL SHEET FOR DIMENSIONS AND LOCATIONS.

**BENT BAR DETAILS**



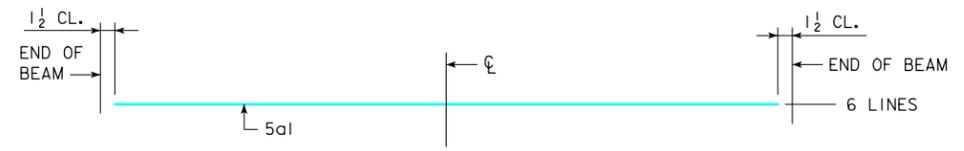
**ALTERNATE BAR NOTES:**  
 ALTERNATE BARS SHOWN IN BENT BAR DETAILS MAY BE USED IN LIEU OF REINFORCING BARS SHOWN IN BAR LIST. NO ADDITIONAL PAYMENT SHALL BE MADE FOR USE OF ALTERNATE BARS.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**BTB BEAM DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 23 OF 29 FILE NO. 30541 DESIGN NO. 1018

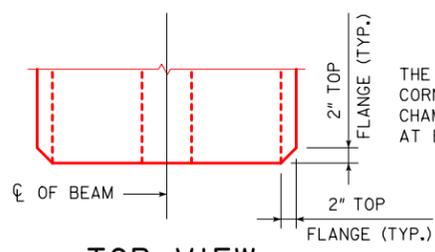


BTB40

NOTE: THIS BEAM USES MODIFIED STIRRUP EXTENSIONS.

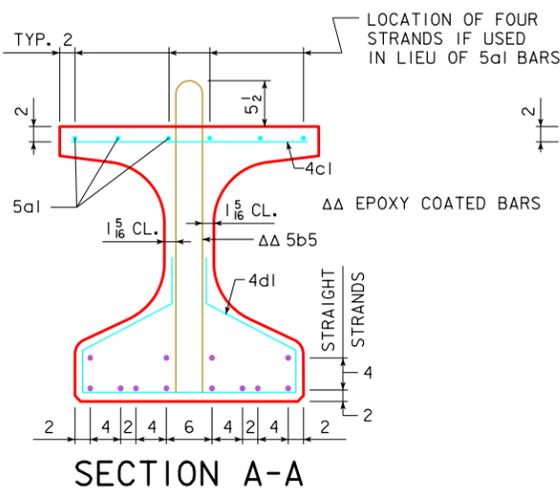


TOP FLANGE LONGITUDINAL BAR LAYOUT

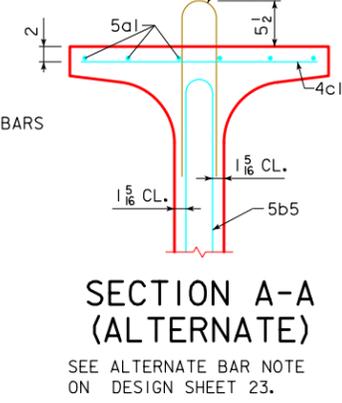


TOP VIEW

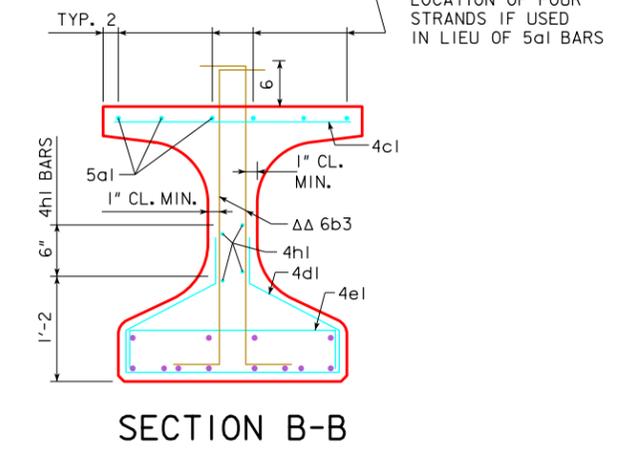
THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.



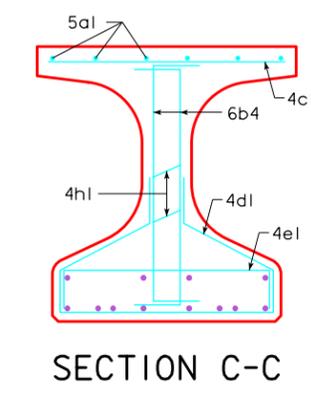
SECTION A-A



SECTION A-A (ALTERNATE)

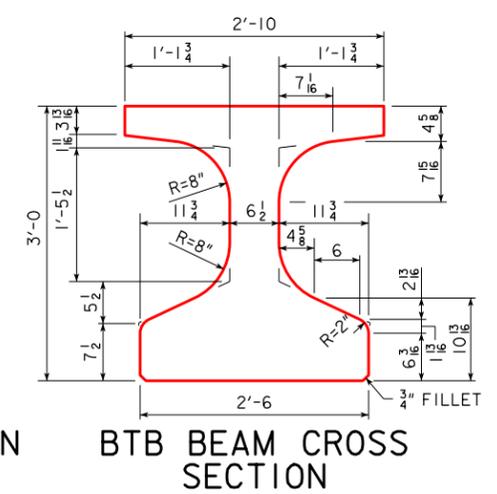


SECTION B-B



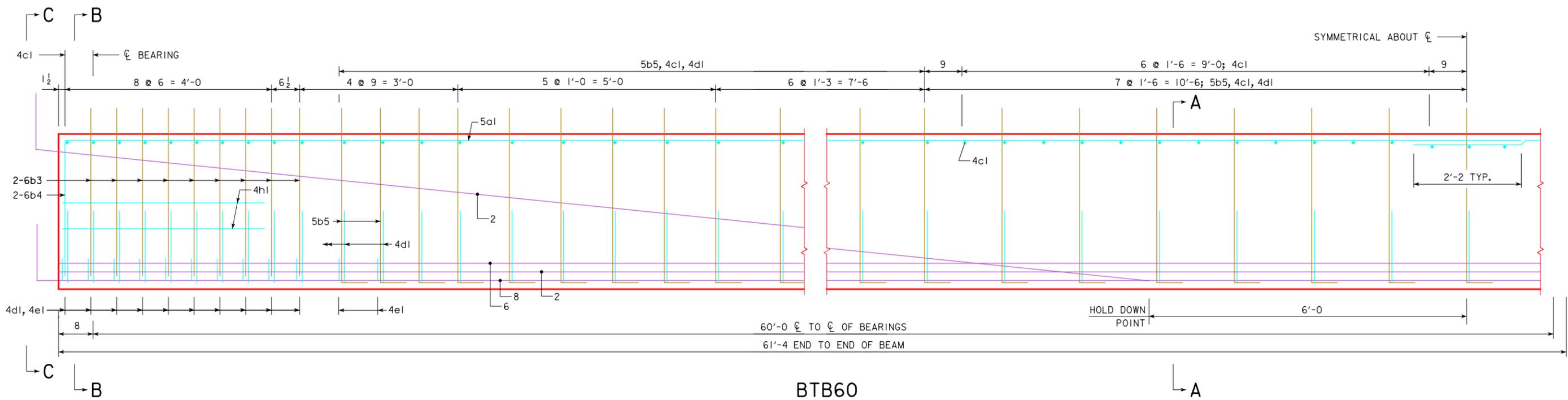
SECTION C-C

BEAM SECTION PROPERTIES  
 AREA = 631.7 in<sup>2</sup>  
 y<sub>b</sub> = 17.14 in.  
 I = 99,980 in<sup>4</sup>

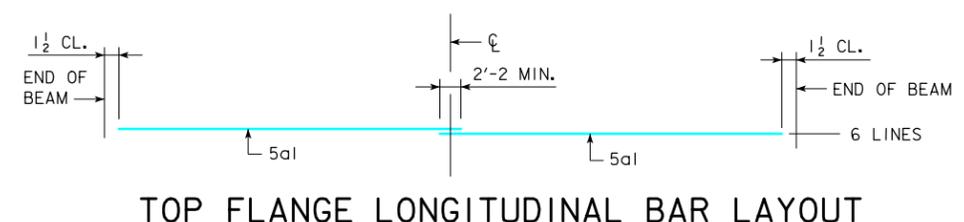


BTB BEAM CROSS SECTION

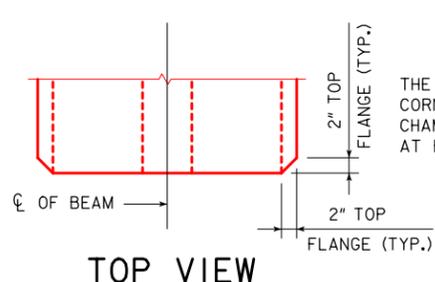
DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**BTB40 BEAM DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 24 OF 29 FILE NO. 30541 DESIGN NO. 1018



NOTE: THIS BEAM USES MODIFIED STIRRUP EXTENSIONS.

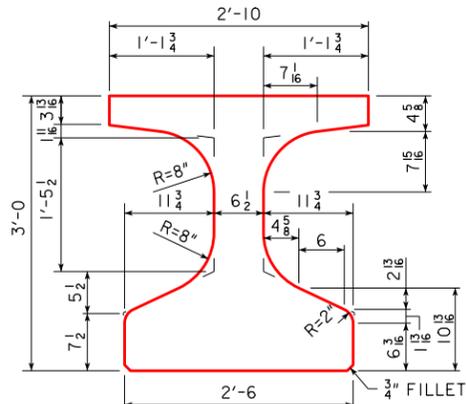


TOP FLANGE LONGITUDINAL BAR LAYOUT



TOP VIEW

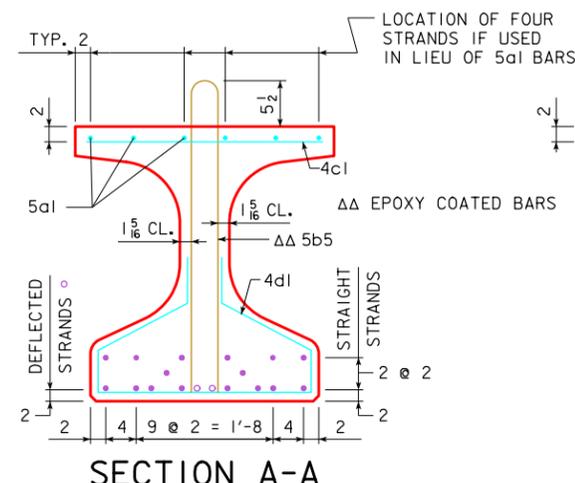
THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.



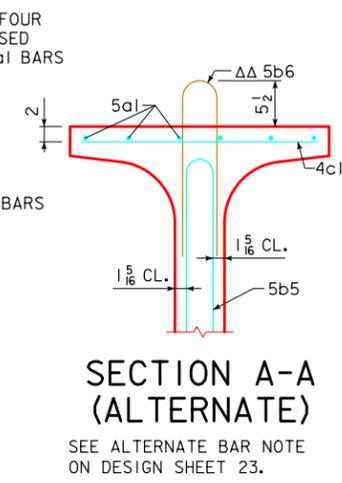
BTB BEAM CROSS SECTION

AREA = 631.7 in<sup>2</sup>  
 $\bar{y}_b = 17.14$  in.  
 $I = 99,980$  in<sup>4</sup>

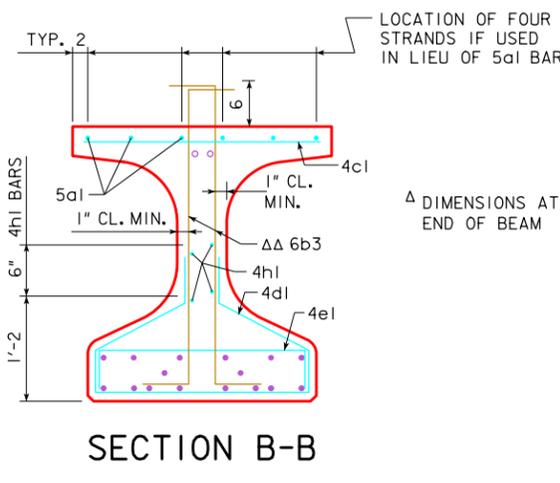
BEAM SECTION PROPERTIES



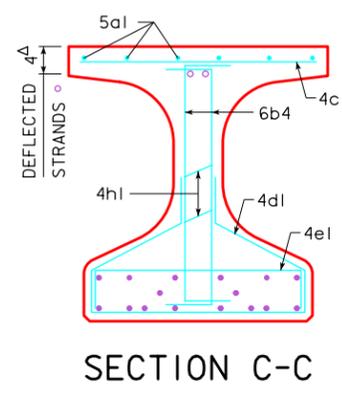
SECTION A-A



SECTION A-A (ALTERNATE)



SECTION B-B



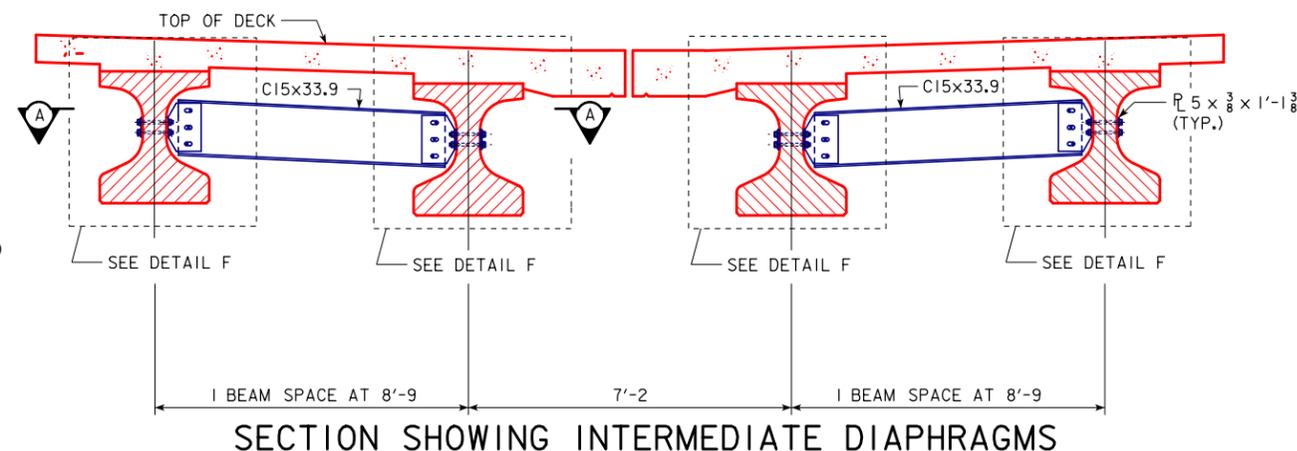
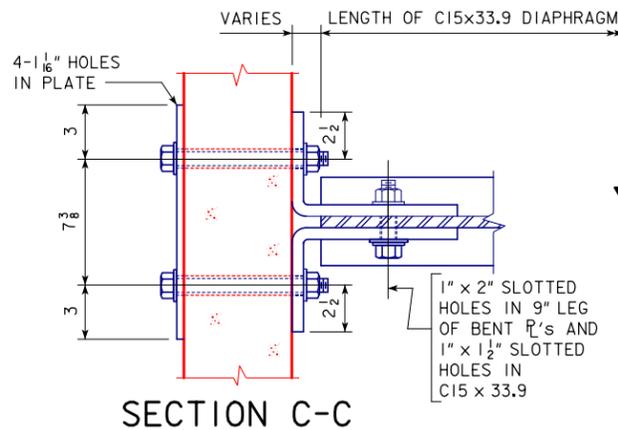
SECTION C-C

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**BTB60 BEAM DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 25 OF 29 FILE NO. 30541 DESIGN NO. 1018



# BULB TEE "B" BEAM INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE BEAM CONNECTION (DETAIL "F")		WEIGHT	
4 - $\frac{7}{8}$ " $\phi$ x 9/4 H.S. BOLTS WITH NUTS & WASHERS = 9.6 LBS.		NO. OF BEAM CONNECTIONS	115
ONE DETAIL "F"		12	85
1 - BACKING PL 5 x $\frac{3}{8}$ x 1'-1 $\frac{3}{8}$ = 7.1 LBS.		12	85
2 - BENT PL 9 x 6 x $\frac{1}{2}$ x 0'-11 = 46.8 LBS.		12	562
ONE DIAPHRAGM		NUMBER OF DIAPHRAGMS	
6 - $\frac{7}{8}$ " $\phi$ x 3" H.S. BOLTS WITH NUTS & WASHERS = 7.8 LBS.		6	47
LENGTH OF MEMBER		6	1538
1 - C15 x 33.9 = 33.9 LBS./FT.		7'-6 $\frac{3}{4}$	6
INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL - TOTAL (LBS.)		2347	



STRUCTURAL STEEL	
WEIGHT	2347 LBS.

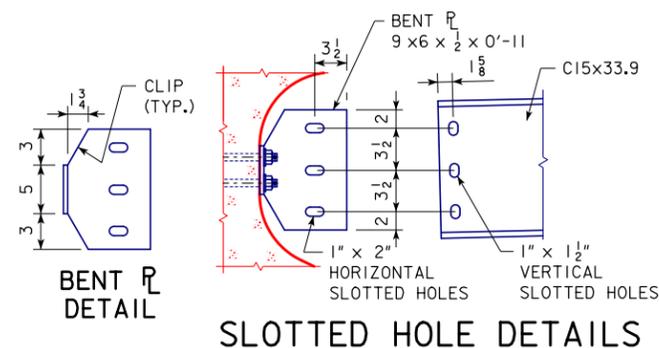
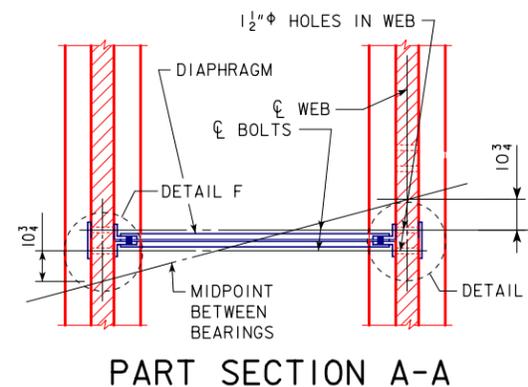
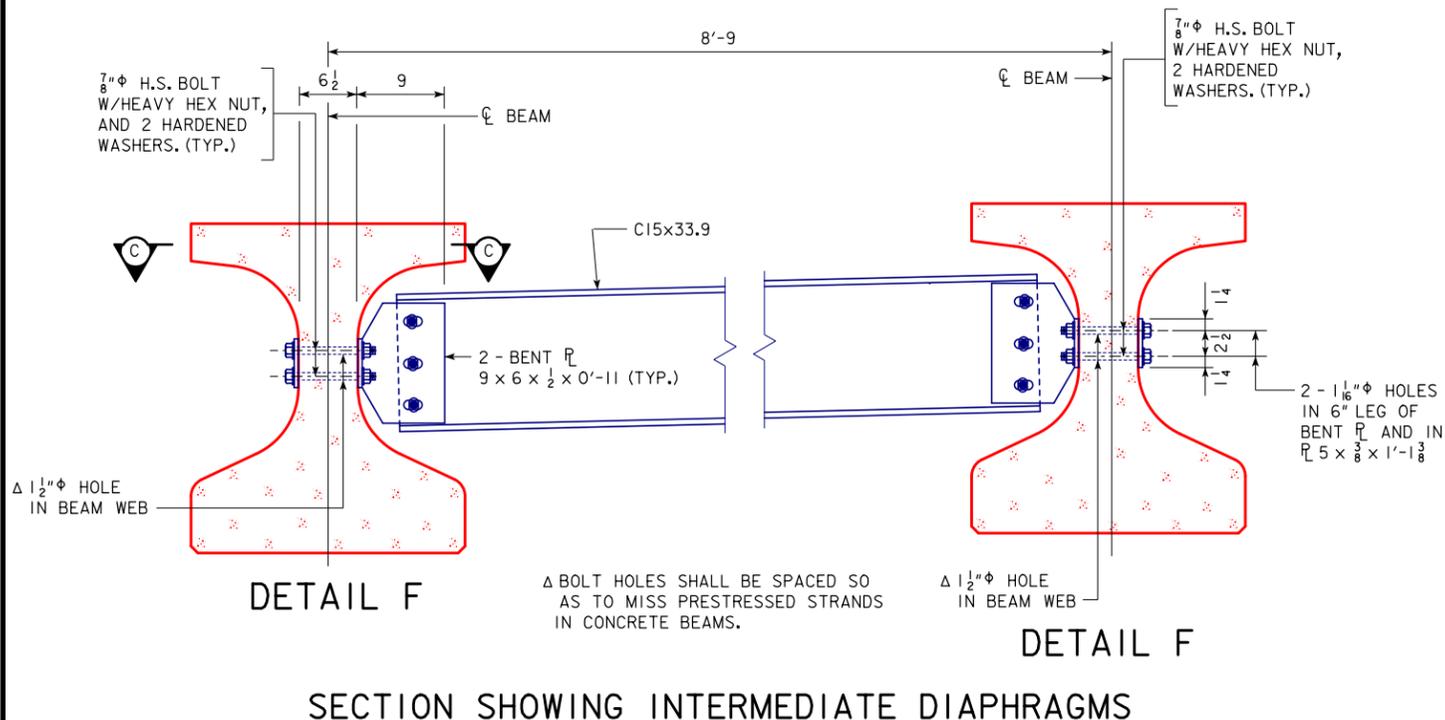
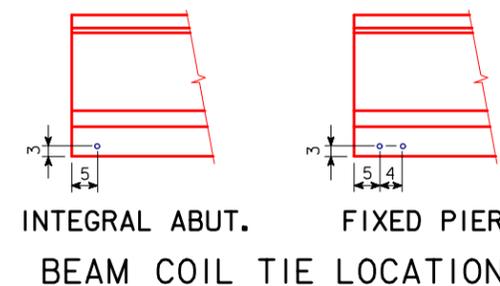
NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

### NOTES:

- ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS 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  $\frac{1}{2}$ "  $\phi$  HOLES FOR THE  $\frac{7}{8}$ "  $\phi$  H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.
- THE  $\frac{7}{8}$ "  $\phi$  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.
- ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BRIDGE FLOOR CONCRETE WITH THE FOLLOWING EXCEPTION: BOLTS IN DIAPHRAGMS LOCATED UNDER LONGITUDINAL BRIDGE FLOOR CONSTRUCTION JOINTS SHALL NOT BE TIGHTENED UNTIL STAGE TWO OF THE BRIDGE FLOOR HAS BEEN PLACED.

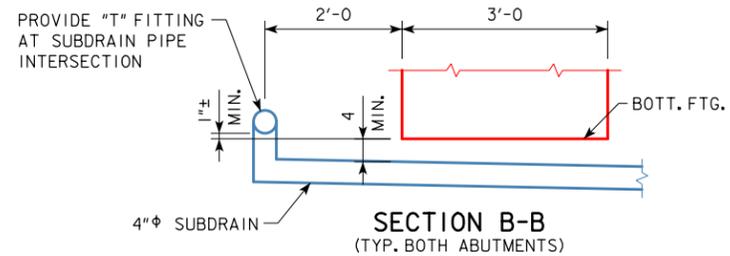
	BTB40	BTB60	BTB90
Length	19'-1 $\frac{7}{8}$ "	29'-1 $\frac{7}{8}$ "	44'-1 $\frac{7}{8}$ "
Diaphragm Spacing	7 $\frac{3}{8}$ "	7 $\frac{3}{8}$ "	7 $\frac{3}{8}$ "
Diaphragm Offset	1'-9 $\frac{1}{2}$ "	1'-9 $\frac{1}{2}$ "	1'-9 $\frac{1}{2}$ "
Diaphragm Thickness	7 $\frac{3}{8}$ "	7 $\frac{3}{8}$ "	7 $\frac{3}{8}$ "

### INTERMEDIATE DIAPHRAGM BOLT HOLE LOCATIONS



DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS      92'-0 INTERIOR SPAN  
**STEEL DIAPHRAGM DETAILS**  
 STATION 329+91.45      (STAGE A)      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 27 OF 29      FILE NO. 30541      DESIGN NO. 1018

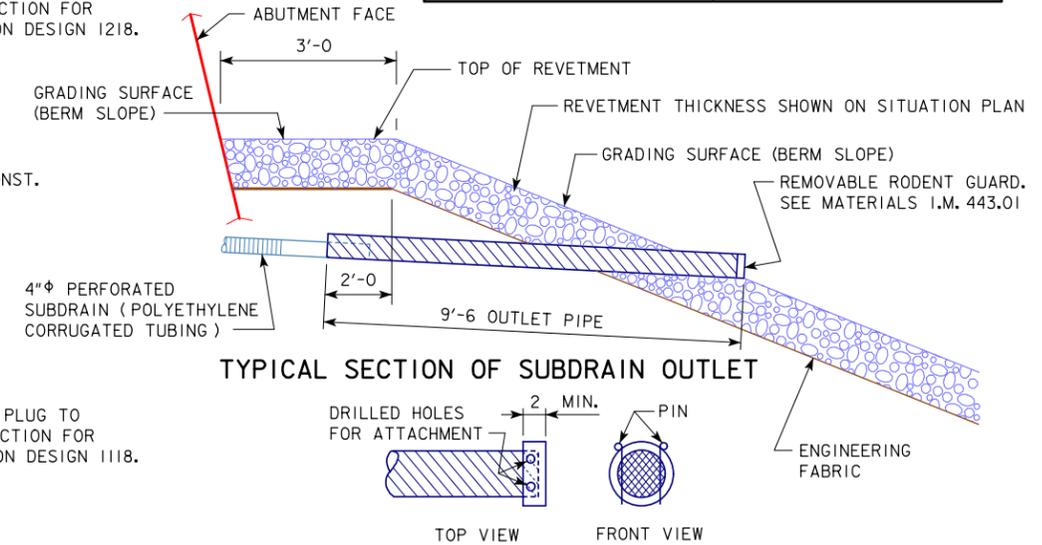
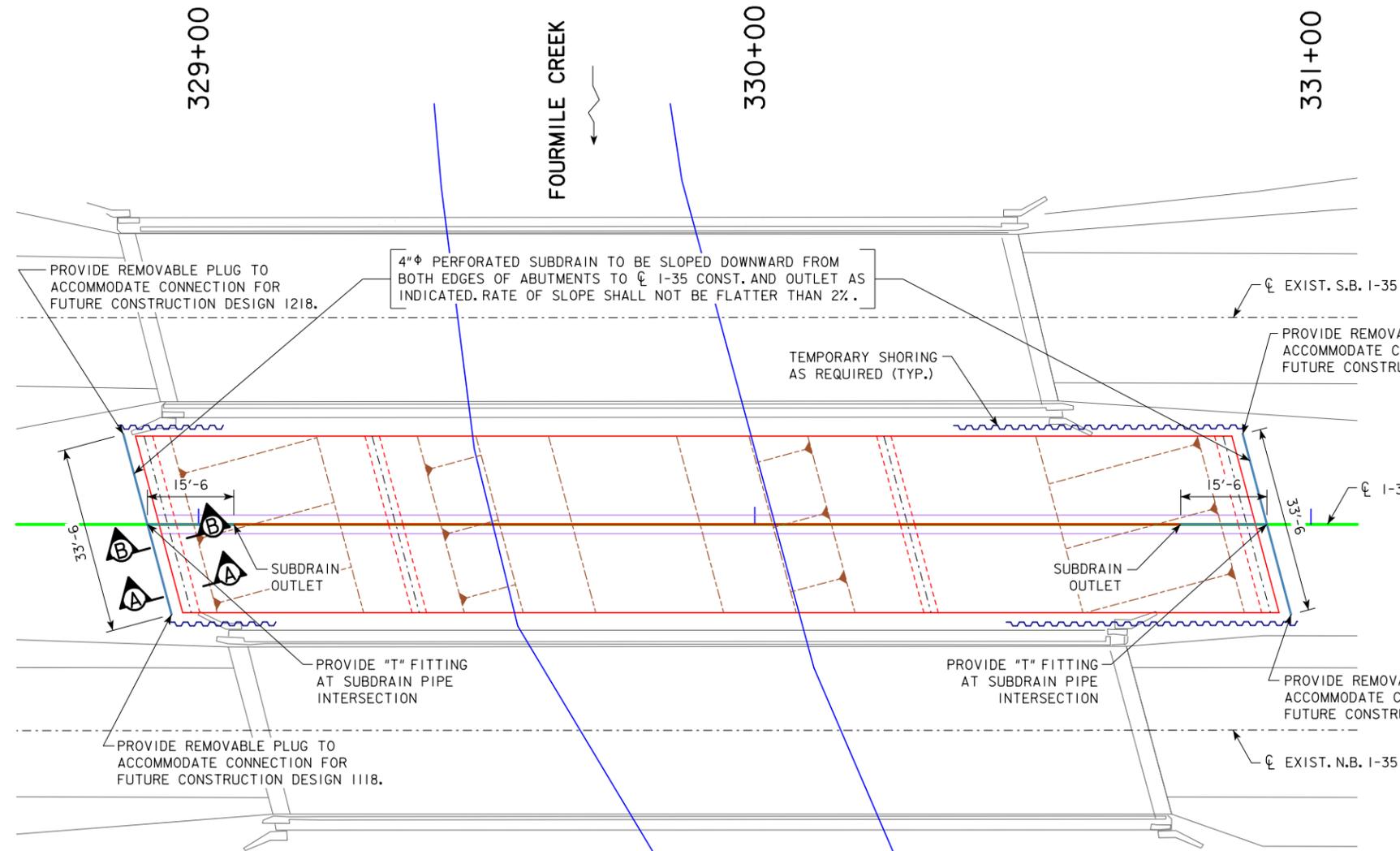
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



**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 SHALL BE IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS.  
 THE SUBDRAIN OUTLET SHALL CONSIST OF A LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET. THE LENGTH OF THE OUTLET PIPE SHALL BE DETERMINED BY THE REVETMENT AND ITS PLACEMENT LOCATION. THE CONTRACTOR IS TO INSURE THE OUTLET PIPE IS ADEQUATELY STRONG ENOUGH AND WILL NOT BE DAMAGED WHEN REVETMENT IS PLACED. A CHECK WILL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT THE SUBDRAIN IS NOT DAMAGED AND IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS. IF A METAL OUTLET PIPE IS USED, IT SHALL BE 6 INCHES IN DIAMETER AND COUPLED TO THE 4 INCH DIAMETER SUBDRAIN IN ONE OF THE TWO FOLLOWING WAYS.  
 1. USE AN INSIDE FIT REDUCER COUPLER (COUPLER MUST BE INSERTED A MINIMUM OF 1'-0 INTO THE METAL OUTLET PIPE).  
 2. INSERT 1'-0 OF THE 4"φ SUBDRAIN INTO THE 6"φ METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.  
 THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". 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.

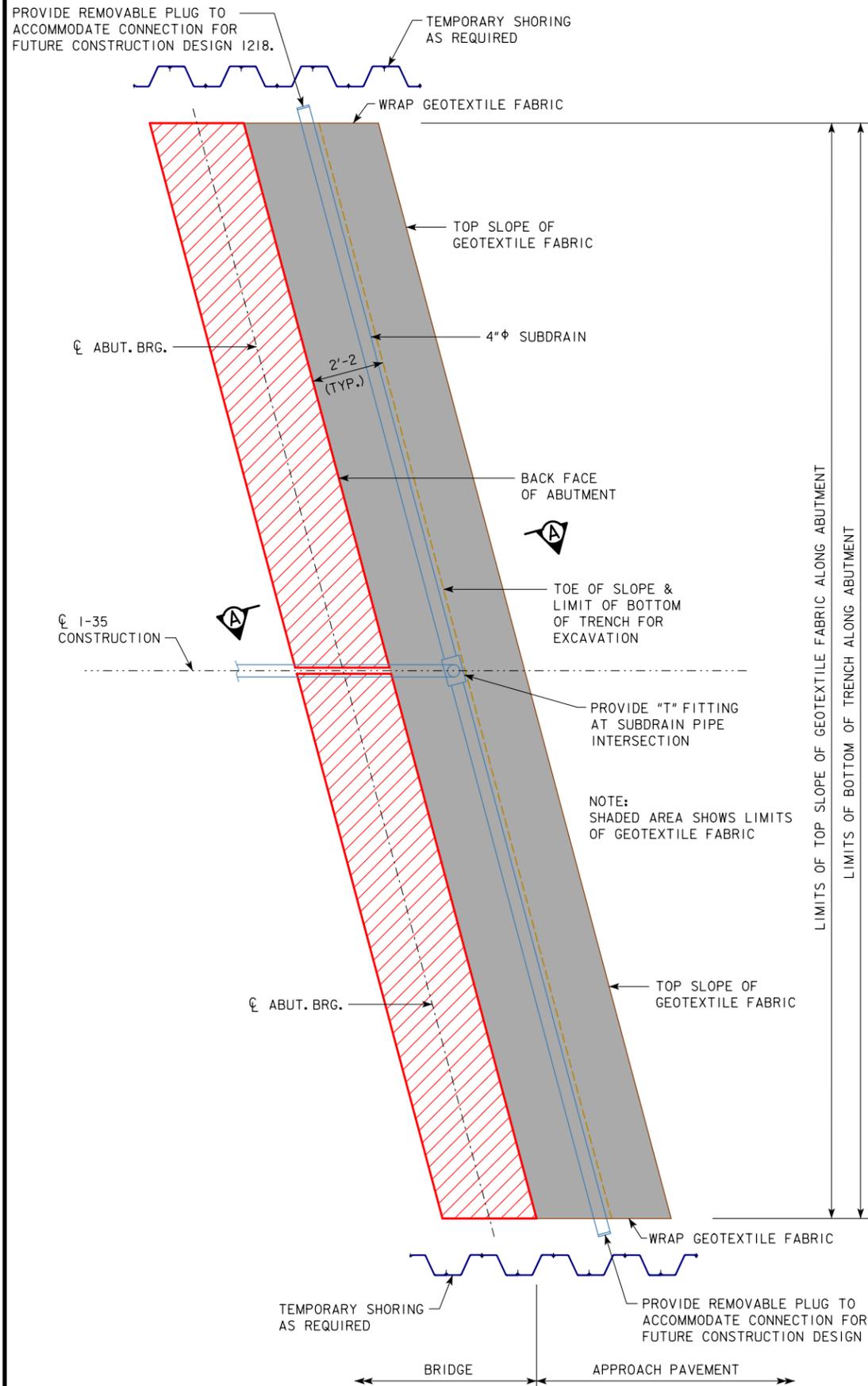
SUBDRAIN OUTLET ELEVATIONS	
LOCATION	ELEVATION
SOUTH ABUTMENT	897.25
NORTH ABUTMENT	898.37



**REMOVABLE RODENT GUARD DETAILS  
 REVETMENT STONE (EMBEDDED) OUTLET DETAILS**

NOTE:  
 SECTION A-A IS SHOWN ON ABUTMENT BACKFILL DETAILS SHEET.

DESIGN FOR 15° SKEW (R.A.)  
**DUAL 194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SUBDRAIN DETAILS**  
 STATION 329+91.45 (STAGE A) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 28 OF 29 FILE NO. 30541 DESIGN NO. 1018



### ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 5 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

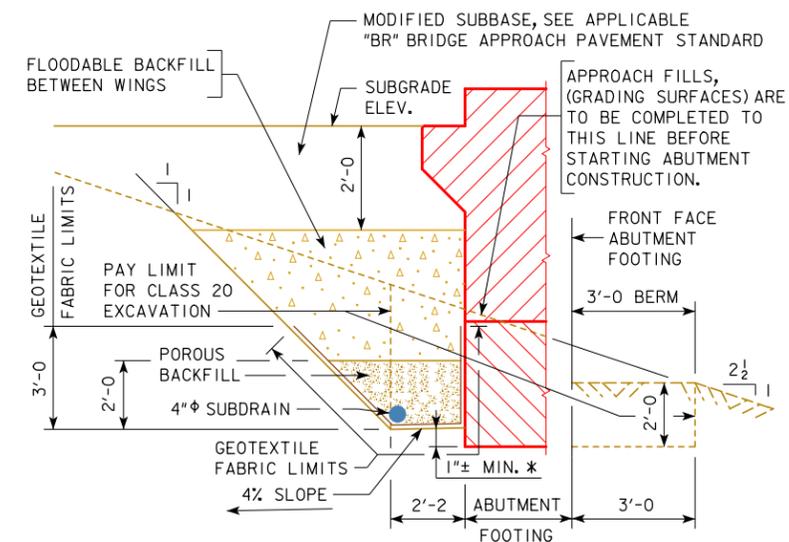
WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

### NOTE:

SUBDRAIN SHALL BE CAPPED WITH A REMOVABLE PLUG AT HIGH END AT THE EDGE OF EACH ABUTMENT AS SHOWN AND SLOPE DOWNWARD 2% TO  $\phi$  1-35 CONSTRUCTION.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



### SECTION A-A BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

\* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

NOTE:  
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

DESIGN FOR 15° SKEW (R.A.)

**DUAL 194'-0" x 15'-9" PRETENSIONED  
PRESTRESSED CONCRETE BEAM BRIDGE**

41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN

**ABUTMENT BACKFILL DETAILS**

STATION 329+91.45 (STAGE A) MAY 2017

**POLK COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 29 OF 29 FILE NO. 30541 DESIGN NO. 1018

**ESTIMATED BRIDGE QUANTITIES - DESIGN NO. 1118**

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	2012	
2	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	528	
4	2402-2721000	EXCAVATION, CLASS 21	CY	759	
5	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	578.4	
6	2403-7000210	HIGH PERFORMANCE STRUCTURAL CONCRETE	CY	419.8	
7	2404-7775000	REINFORCING STEEL	LB	60,141	
8	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	118,884	
9	2404-7775009	REINFORCING STEEL, STAINLESS STEEL	LB	1617	
10	2407-0562840	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB40	EACH	7	
11	2407-0562860	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB60	EACH	7	
12	2407-0562890	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB90	EACH	7	
13	2408-7800000	STRUCTURAL STEEL	LB	8367	
14	2414-6424038	CONCRETE BARRIER RAIL, 3'-8"	LF	211.1	
15	2501-0201057	PILES, STEEL, HP 10 X 57	LF	6790	
16	2501-6335010	PREBORED HOLES	LF	200	
17	2501-8400172	TEMPORARY SHORING	LS	1.00	
18	2507-2638650	BRIDGE WING ARMORING - EROSION STONE	SY	8.6	
19	2507-3250005	ENGINEERING FABRIC	SY	2973	
20	2507-6800061	REVTMENT, CLASS E	TON	3220	
21	2526-8285000	CONSTRUCTION SURVEY	LS	1.00	
22	2533-4980005	MOBILIZATION	LS	1.00	
23	2599-9999010	VIBRATION MONITORING	LS	1.00	

**ESTIMATE REFERENCE INFORMATION - DESIGN NO. 1118**

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL CONSISTS OF EXCAVATION REQUIRED TO EMBED THE REVETMENT, ENGINEERING FABRIC, AND CLASS E RIPRAP. SEE DESIGN SHEET 5 FOR QUANTITY ITEMIZATION.
2	2401-6745625	REMOVAL OF EXISTING BRIDGE --
3	2402-2720000	EXCAVATION, CLASS 20 --
4	2402-2721000	EXCAVATION, CLASS 21 --
5	2403-0100010	STRUCTURAL CONCRETE (BRIDGE) --
6	2403-7000210	HIGH PERFORMANCE STRUCTURAL CONCRETE THIS BID ITEM INCLUDES THE CONCRETE FOR THE DECK, ABUTMENT DIAPHRAGMS, PIER DIAPHRAGMS, AND WINGWALLS. REFER TO THE DEVELOPMENTAL SPECIFICATION FOR "HIGH PERFORMANCE CONCRETE FOR STRUCTURES" FOR ADDITIONAL INFORMATION.
7	2404-7775000	REINFORCING STEEL COST OF MECHANICAL SPLICE ASSEMBLIES AT THE PIERS IS INCLUDED IN DESIGN 1018.
8	2404-7775005	REINFORCING STEEL, EPOXY COATED COST OF MECHANICAL SPLICE ASSEMBLIES IN THE DECK, ABUTMENT, AND PIER DIAPHRAGMS IS INCLUDED IN DESIGN 1018.
9	2404-7775009	REINFORCING STEEL, STAINLESS STEEL --
10	2407-0562840	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB40 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.

**ESTIMATE REFERENCE INFORMATION - DESIGN NO. 1118**

ITEM NO.	ITEM CODE	DESCRIPTION
11	2407-0562860	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB60 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.
12	2407-0562890	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB90 INCLUDES PIER BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.
13	2408-7800000	STRUCTURAL STEEL --
14	2414-6424038	CONCRETE BARRIER RAIL, 3'-8" IF PLACEMENT OF CONCRETE IS DONE BY THE SLIPFORMING METHOD, CLASS BR CONCRETE IS REQUIRED. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. PRICE BID FOR THIS ITEM SHALL INCLUDE THE COST OF CAST-IN-PLACE FORMS IF REQUIRED FOR PLACEMENT OF THE CONCRETE. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS. INCLUDES 227 FT. OF 2" DIAMETER RIGID STEEL CONDUIT.
15	2501-0201057	PILES, STEEL, HP 10 X 57 --
16	2501-6335010	PREBORED HOLES --
17	2501-8400172	TEMPORARY SHORING INCLUDES REMOVAL OF SHORING BETWEEN DESIGNS 1018 & 1118.
18	2507-2638650	BRIDGE WING ARMORING - EROSION STONE INCLUDES FURNISHING AND PLACING ENGINEERING FABRIC, EROSION STONE, AND ALL REQUIRED EXCAVATING, SHAPING AND COMPACTING FOR WING ARMORING.
19	2507-3250005	ENGINEERING FABRIC SEE DESIGN SHEET 5 FOR DETAILS AND QUANTITY ITEMIZATION. ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
20	2507-6800061	REVTMENT, CLASS E SEE DESIGN SHEET 5 FOR DETAILS AND QUANTITY ITEMIZATION. ESTIMATED AT 1.6 TON/CY.
21	2526-8285000	CONSTRUCTION SURVEY --
22	2533-4980005	MOBILIZATION --
23	2599-9999010	VIBRATION MONITORING REFER TO THE SPECIAL PROVISIONS FOR "VIBRATION MONITORING" FOR ADDITIONAL INFORMATION.

NOTE:  
ROADWAY QUANTITIES SHOWN  
ON SHEET C.I IN THESE PLANS.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**ESTIMATED BRIDGE QUANTITIES**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 36 FILE NO. 30451 DESIGN NO. 1118



## SPECIFICATIONS:

DESIGN: AASHTO LRFD 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT, INCLUDING: DEVELOPMENTAL SPECIFICATIONS FOR HIGH PERFORMANCE CONCRETE FOR STRUCTURES, SPECIAL PROVISIONS FOR VIBRATION MONITORING.

## DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5,  $f'_c = 4.0$  KSI, EXCEPT PRESTRESSED BEAM CONCRETE AS NOTED.

PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEETS 26 THRU 29. BRIDGE DECK CONCRETE  $f'_c = 4.0$  KSI.

STRUCTURAL STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 6. ASTM A709 GRADE 36 AND GRADE 50 (AASHTO M270 GRADE 36 AND GRADE 50).

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO WIDEN AN EXISTING 194'-0" x 15'-9" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH A 15° R.A. SKEW (N.B. BRIDGE OF POLK COUNTY DESIGN 1018) AN ADDITIONAL 61'-2", WHICH IS STAGE B OF THE DUAL BRIDGE PROJECT (STAGE B OF THE DUAL BRIDGE PROJECT CORRESPONDS TO STAGE 3 OF THE ROADWAY PROJECT IM-NHS-035-4(140)92--03-77); STAGE C AND THE FINAL STAGE WILL BE COMPLETED UNDER A FUTURE SEPARATE DESIGN (POLK 1218). THE FINAL CONFIGURATION WILL BE DUAL 194'-0" x 75'-4" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES.

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 159'-2" x 30'-0" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE DESIGN NO. 1062 WITH A YEAR OF CONSTRUCTION OF 1964 (N.B. BRIDGE ONLY). ELECTRONIC PLANS OF THE EXISTING STRUCTURE ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

THE LUMP SUM BID FOR "REMOVAL OF EXISTING BRIDGE" SHALL INCLUDE REMOVAL OF THE EXISTING 159'-2" x 30'-0" PPCB BRIDGE.

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS.

THE CITY AND 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 CONSTRUCTION STARTING DATE.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

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

REFER TO ROADWAY PLANS FOR TEMPORARY BARRIER DETAILS AND LOCATIONS.

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.

CLASS 20 EXCAVATION QUANTITIES ARE BASED ON THE ASSUMPTION THAT THE CLASS 10 ROADWAY WORK IS COMPLETED PRIOR TO STARTING CONSTRUCTION OF THE ABUTMENTS AND PIERS.

THE APPROACH FILLS AS SHOWN ARE INCLUDED IN THE GRADING PLANS FOR THE PROJECT IM-NHS-035-4(140)92--03-77 AND ARE TO BE IN PLACE BEFORE ABUTMENT PILES ARE DRIVEN. THE BRIDGE CONTRACTOR IS TO LEVEL OFF AND SHAPE THE BERMS TO THE ELEVATIONS AND DIMENSIONS SHOWN. DRESSING OF SLOPES OUTSIDE THE BRIDGE AREA NOT DISTURBED BY THE BRIDGE CONTRACTOR SHALL BE PAID FOR AS EXTRA WORK.

THE BRIDGE CONTRACTOR SHALL PREBORE HOLES FOR ABUTMENT PILES. HOLES SHALL BE BORED TO THE ELEVATIONS SHOWN ON THE "LONGITUDINAL SECTION ALONG CENTERLINE ROADWAY" ON DESIGN SHEET 4. PILES SHALL BE DRIVEN THROUGH THE HOLES TO AT LEAST THE SPECIFIED DESIGN BEARING.

NOTE: SUBDRAIN SLOPED DOWNWARD 2% FROM C N.B. 1-35 TO EXTEND THRU FILL (TYPICAL BOTH ABUTMENTS).

"REMOVALS AS PER PLAN" INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE EDGE OF DECK, CURB, BARRIER RAIL, PIER, HAUNCHES, ABUTMENT FOOTING, END POSTS, AND WINGWALLS AS SHOWN ON DESIGN SHEET 6. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO OTHER PORTIONS OF THE EXISTING STRUCTURE NOT NOTED FOR REMOVAL SHALL BE THE RESPONSIBILITY OF THE BRIDGE CONTRACTOR AND SHALL BE REPAIRED AT NO EXTRA COST TO THE STATE.

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM. COST SHALL ONLY INCLUDE REMOVAL OF SHORING BETWEEN DESIGNS 1018 AND 1118. SHORING BETWEEN DESIGNS 1018 AND 1218 SHALL REMAIN IN PLACE AND BE REMOVED IN A FUTURE CONTRACT (DESIGN 1218). ALL MATERIAL USED FOR SHORING THAT IS REMOVED SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

THE BRIDGE CONTRACTOR IS TO RETAIN EARTH AND/OR GRANULAR MATERIAL BEHIND THE PORTION OF ABUTMENTS SUBJECTED TO TRAFFIC DURING WIDENING BY METHODS APPROVED BY THE ENGINEER. ALL COSTS FOR RETAINING THE EARTH AND/OR GRANULAR MATERIAL SHALL BE INCLUDED IN THE PRICE BID FOR "CLASS 20 EXCAVATION".

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03, A, 2 OF THE STANDARD SPECIFICATIONS. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

GUARDRAIL WILL BE PLACED BY THE PAVING CONTRACTOR AS A PART OF THE PROJECT NHS-035-4(198)92--11-77.

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

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

## BRIDGE DECK DIMENSIONS TABLE

NO.	ITEM	UNIT	QUANTITY
1	DECK LENGTH	L.F.	197.1
2	MINIMUM DECK WIDTH	L.F.	62.8
3	MAXIMUM DECK WIDTH	L.F.	62.8
4	DECK AREA	S.F.	12,378

1. DECK LENGTH IS MEASURED FROM FACE-TO-FACE OF PAVING NOTCHES ALONG THE CENTERLINE OF THE ROADWAY.
- 2, 3. DECK WIDTHS ARE MEASURED FROM OUT-TO-OUT OF DECK PERPENDICULAR TO THE CENTERLINE OF ROADWAY.
4. DECK AREA IS TO BE BASED ON THE FACE-TO-FACE PAVING NOTCH DISTANCE AND OUT-TO-OUT DECK DIMENSIONS.

DURING CONSTRUCTION OF THIS PROJECT THE BRIDGE CONTRACTOR WILL BE REQUIRED TO COORDINATE OPERATIONS WITH THOSE OF OTHER CONTRACTORS WORKING WITHIN THE SAME AREA. OTHER WORK IN PROGRESS DURING THE SAME PERIOD OF TIME WILL INCLUDE, BUT IS NOT LIMITED TO, CONSTRUCTION OF THE FOLLOWING PROJECTS:

REFER TO ROADWAY PLAN SHEET J.1 FOR LISTING OF OTHER WORK IN PROGRESS DURING THE SAME PERIOD OF TIME.

## DESIGN HISTORY AT THIS SITE

(INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
1018	ORIGINAL DESIGN
1118	BRIDGE WIDENING

## SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	STEEL INTERMEDIATE DIAPHRAGMS
2	PRE-CONSTRUCTION CONDITION SURVEY REPORT
3	VIBRATION MONITORING PLAN
4	POST-CONSTRUCTION SURVEY REPORT

### NOTE:

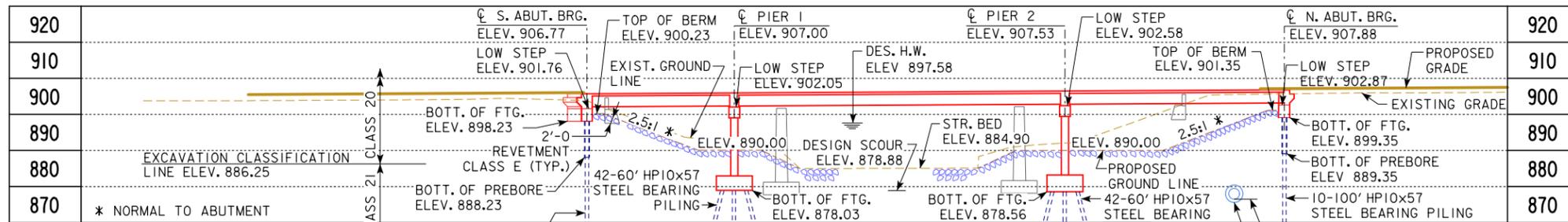
THE POLLUTION PREVENTION PLAN IS NOT INCLUDED IN THESE PLANS, BUT IS INCLUDED IN THE GRADING PLANS FOR THE PROJECT IM-NHS-035-4(140)92--03-77 WHICH IS TIED TO THE BRIDGE PLANS THROUGH THE CONTRACT LETTING PROCESS.

## TRAFFIC CONTROL PLAN

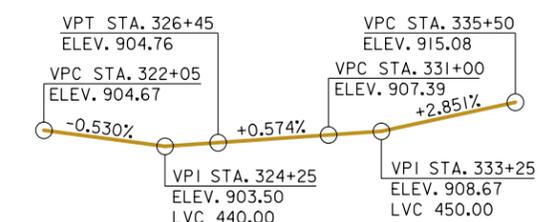
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0" x 75'-4"  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN

**GENERAL NOTES**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 3 OF 36 FILE NO. 30451 DESIGN NO. 1118



BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



NOTE:  
 TOP OF BRIDGE DECK CROWN AT CL N.B. I-35 IS 0.51' ABOVE THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN. DECK DRAINS ARE NOT REQUIRED FOR THIS DESIGN. ALL EXISTING PILES ARE TIMBER PILES. ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED.

LONGITUDINAL SECTION ALONG CL N.B. I-35

UTILITIES LEGEND:  
 EI - ELECTRIC - MID AMERICAN ENERGY  
 F05 - FIBER OPTIC - IOWA DOT  
 San. - SANITARY SEWER - CITY OF ANKENY  
 U - UTILITY POLE  
 S - STORM SEWER INTAKE

TRAFFIC ESTIMATE

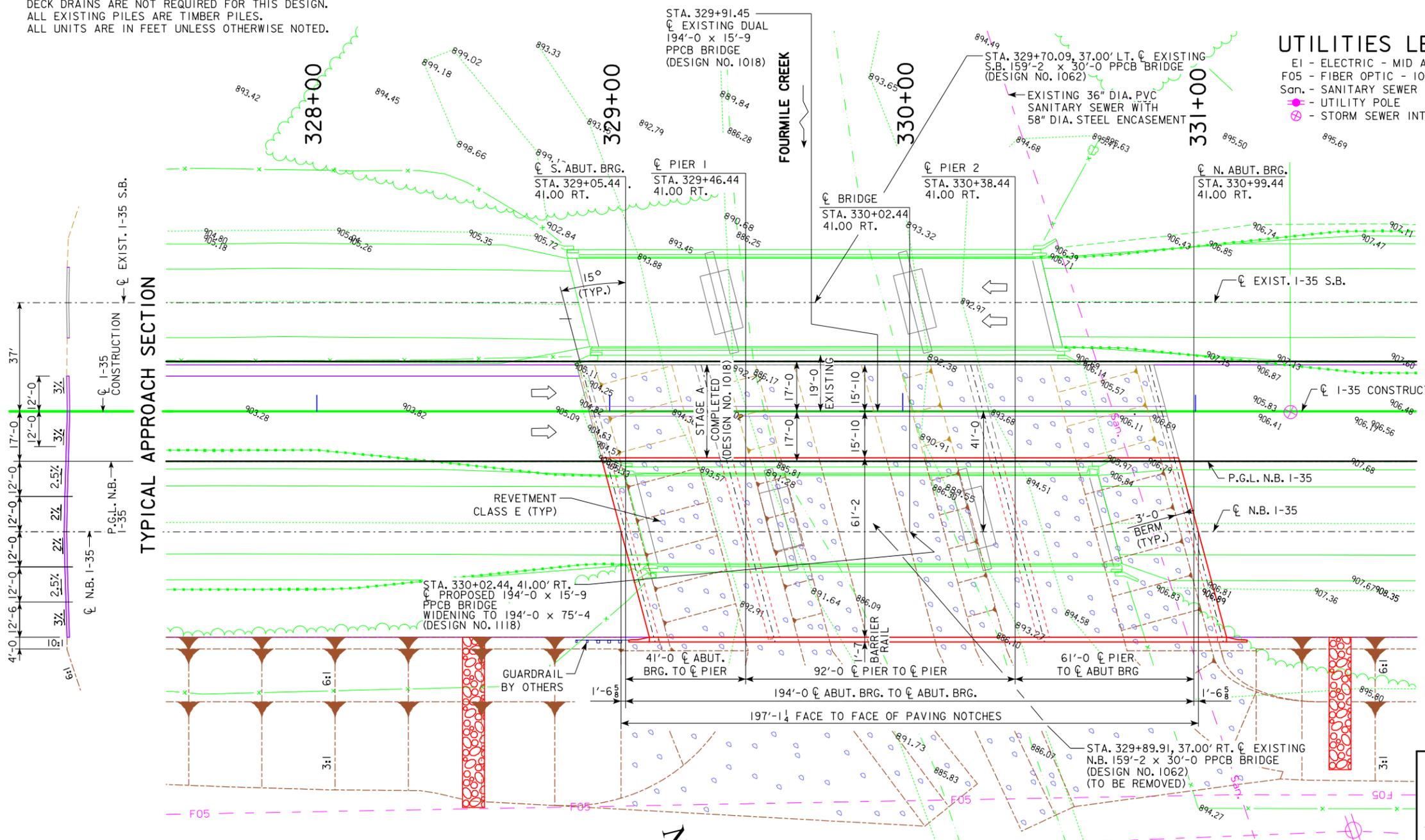
2008 AADT	53,600	V.P.D.
2035 AADT	100,300	V.P.D.
2035 DHV	9,900	V.P.H.
TRUCKS	16	%
TOTAL DESIGN ESALS		

HYDRAULIC DATA

DRAINAGE AREA = 44.9 SQ. MI.  
 STREAM SLOPE = 9.9 FT./MI.  
 AVG. LOW WATER STAGE = 886.3  
 Q<sub>50</sub> = 5,170 CFS  
 STAGE = 896.85  
 BACKWATER = 0.24 FT.  
 Q<sub>100</sub> = 6,140 CFS  
 STAGE = 897.58  
 BACKWATER = 0.33 FT.  
 AVG. BRIDGE VELOCITY = 4.89 FPS  
 Q<sub>200</sub> = 7,280 CFS  
 STAGE = 899.68  
 CALCULATED DESIGN SCOUR = 878.88  
 Q<sub>500</sub> = 8,720 CFS  
 STAGE = 900.55  
 CALCULATED CHECK SCOUR = 877.91  
 ROADWAY OVERTOP 904.54  
 STA. 322+28  
 50, 100 & 500 YR. STAGES AND DISCHARGES FROM CITY OF ANKENY F.I.S., DATED DECEMBER 6, 1999. F.I.S. DATUM (NGVD29) 0.1 FT. BELOW PROJECT DATUM (NAVD88).

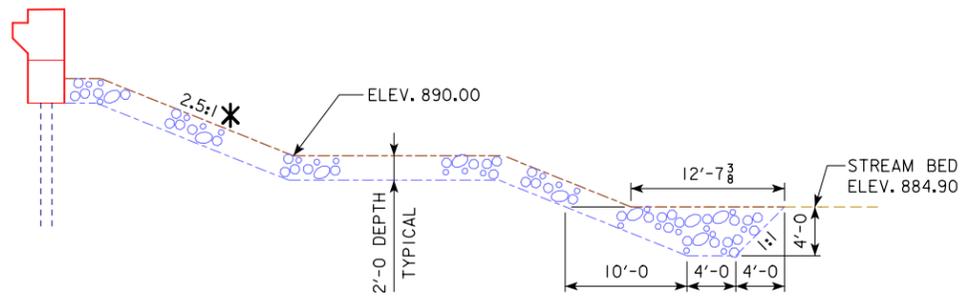
LOCATION

N.B. I-35 OVER FOURMILE CREEK  
 T-80 N R-23 W  
 SECTION 7  
 DOUGLAS TOWNSHIP  
 POLK COUNTY  
 CITY OF ANKENY  
 N.B. FHWA NO. 41811  
 N.B. BRIDGE MAINT. NO. 7793.6R035  
 LATITUDE: 41.74279°  
 LONGITUDE: -93.575024°



SITUATION PLAN (STAGE B)

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
 SITUATION PLAN  
 STATION 330+02.44 41.00' RT. (FINAL STAGE) MAY 2017  
 POLK COUNTY  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 36 FILE NO. 30451 DESIGN NO. 1118



**SECTION THRU EMBEDDED REVETMENT BERM**

\* NORMAL TO ABUTMENT

N.B. I-35 - ESTIMATED BERM ARMORING QTY				
LOCATION	REVETMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	CLASS 10 CHANNEL EXCAVATION (CY)
BERM LINING - SOUTH ABUTMENT	1149	-	1077	718
STONE TOE - SOUTH ABUTMENT	340	-	296	212
BERM LINING - NORTH ABUTMENT	1384	-	1298	865
STONE TOE - NORTH ABUTMENT	347	-	302	217
TOTALS	3220	-	2973	2012

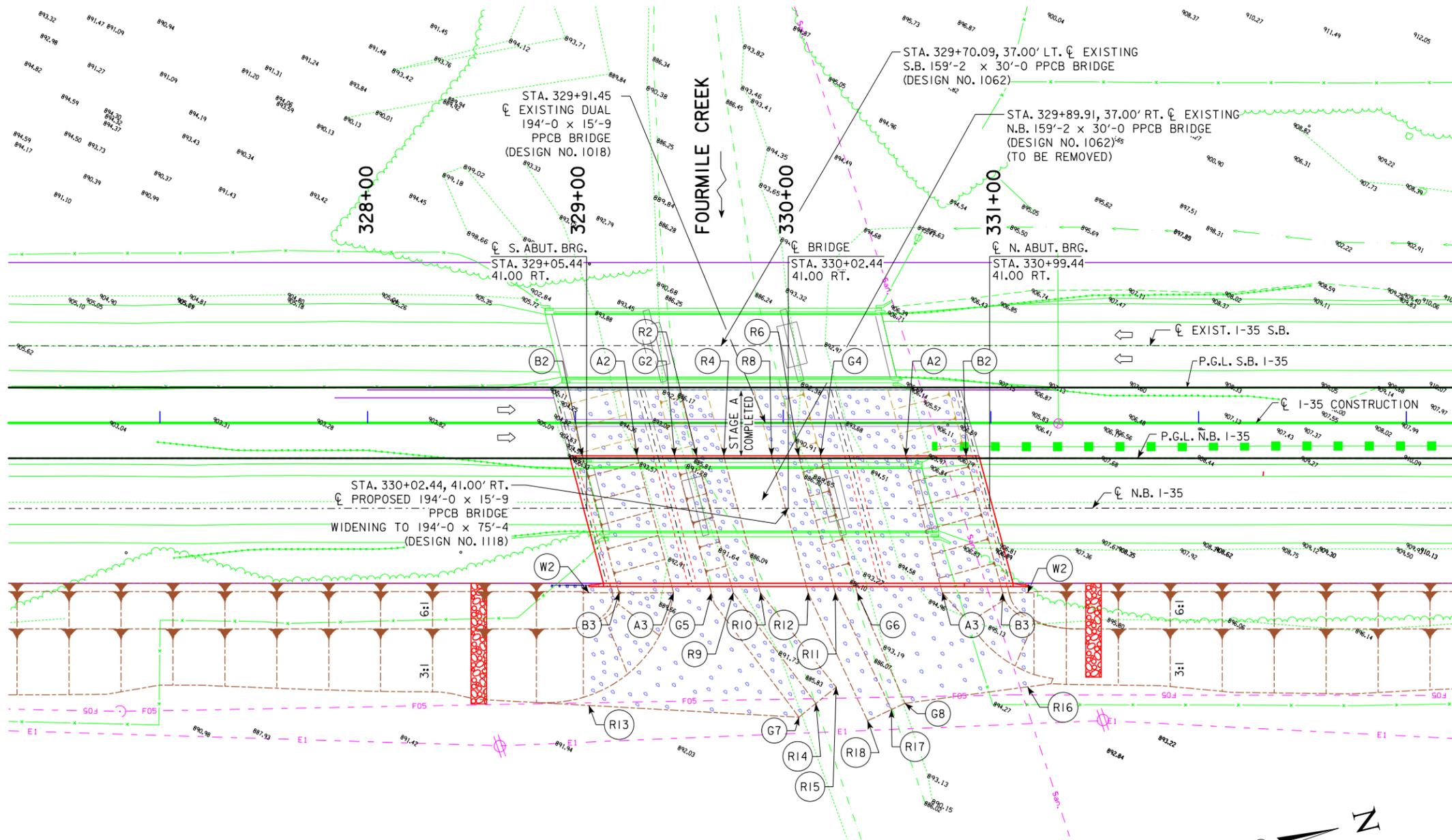
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.  
REVETMENT ESTIMATED AT 1.6 TON/CY.

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

**BERM SLOPE LOCATION TABLE**

POINTS	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A2	329+29.67	15.83' RT	890.00	330+58.99	15.83' RT	890.00
A3	329+47.29	81.58' RT	890.00	330+76.61	81.58' RT	890.00
B2	329+03.35	15.83' RT	900.23	330+88.03	15.83' RT	901.35
B3	329+20.97	81.58' RT	900.23	331+05.65	81.58' RT	901.35
W2	329+06.53	81.58' RT	905.75	331+17.64	81.58' RT	906.97

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE



**GRADING CONTROL:**

- (G2) I-35 329+47.79, 15.83' RT; EDGE OF BENCH
- (G4) I-35 330+18.01, 15.83' RT; EDGE OF BENCH
- (G5) I-35 329+65.41, 81.58' RT; EDGE OF BENCH
- (G6) I-35 330+35.64, 81.58' RT; EDGE OF BENCH
- (G7) I-35 330+07.60, 141.36' RT; EDGE OF BENCH
- (G8) I-35 330+58.60, 134.70' RT; EDGE OF BENCH

**REVETMENT LAYOUT:**

- (R2) I-35 329+58.35, 15.83' RT; END BERM LINING
- (R4) I-35 329+71.41, 15.83' RT; END STONE TOE
- (R6) I-35 330+07.45, 15.83' RT; END BERM LINING
- (R8) I-35 329+94.42, 15.83' RT; END STONE TOE
- (R9) I-35 329+75.97, 81.58' RT; END BERM LINING
- (R10) I-35 329+89.03, 81.58' RT; END STONE TOE
- (R11) I-35 330+25.08, 81.58' RT; END BERM LINING
- (R12) I-35 330+12.04, 81.58' RT; END STONE TOE
- (R13) I-35 329+06.53, 135.74' RT; END BERM LINING
- (R14) I-35 330+15.78, 134.78' RT; END BERM LINING
- (R15) I-35 330+25.53, 126.92' RT; END STONE TOE
- (R16) I-35 331+17.64, 126.79' RT; END BERM LINING
- (R17) I-35 330+52.14, 137.70' RT; END BERM LINING
- (R18) I-35 330+40.63, 143.06' RT; END STONE TOE

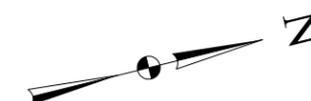
**UTILITIES LEGEND:**

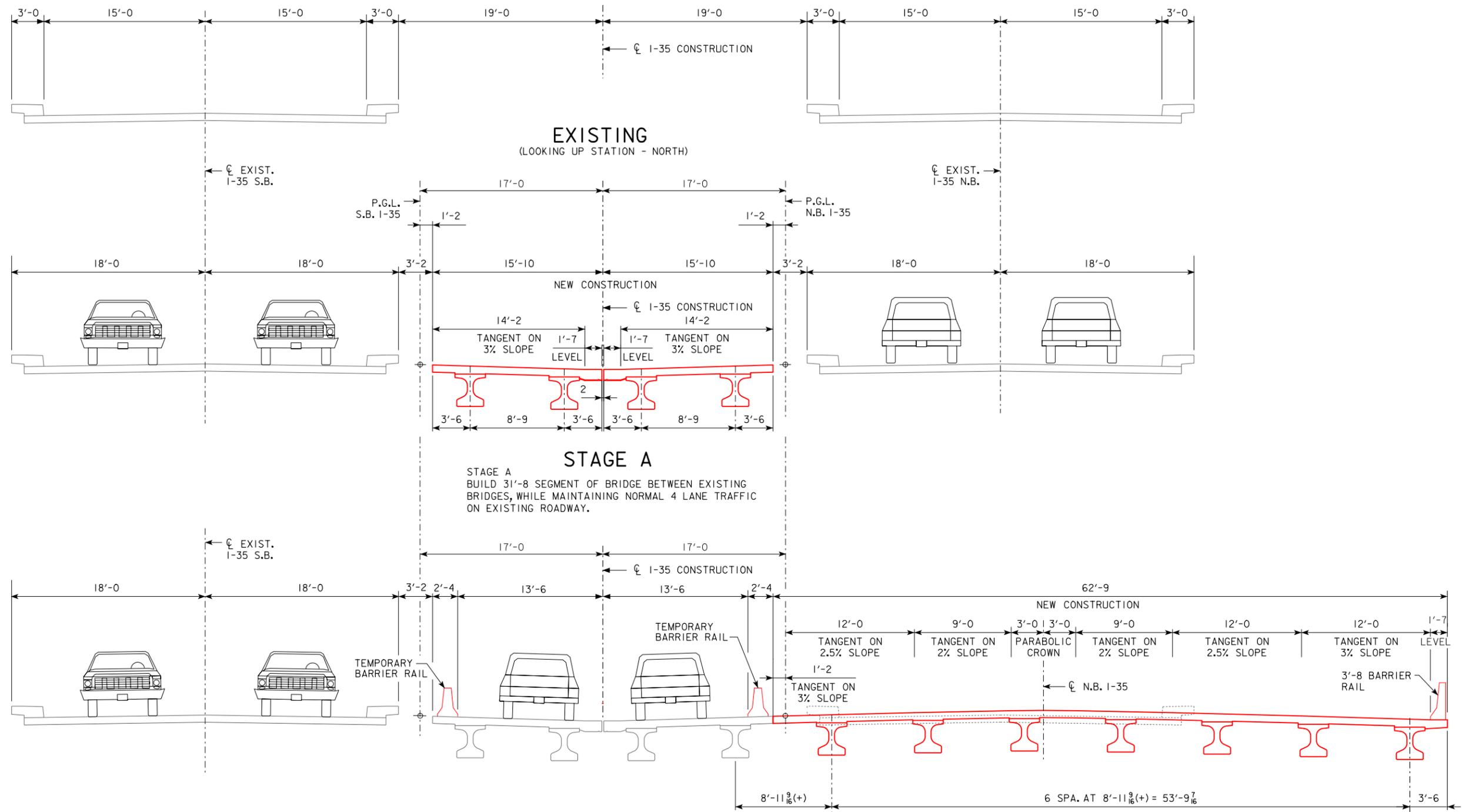
- E1 - ELECTRIC - MID AMERICAN ENERGY
- F05 - FIBER OPTIC - IOWA DOT
- Ssn. - SANITARY SEWER - CITY OF ANKENY
- U - UTILITY POLE
- SS - STORM SEWER INTAKE

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SITE PLAN**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 5 OF 36 FILE NO. 30451 DESIGN NO. 1118

**SITE PLAN  
(STAGE B)**

NOTE: ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED.





**EXISTING**  
(LOOKING UP STATION - NORTH)

**NEW CONSTRUCTION**

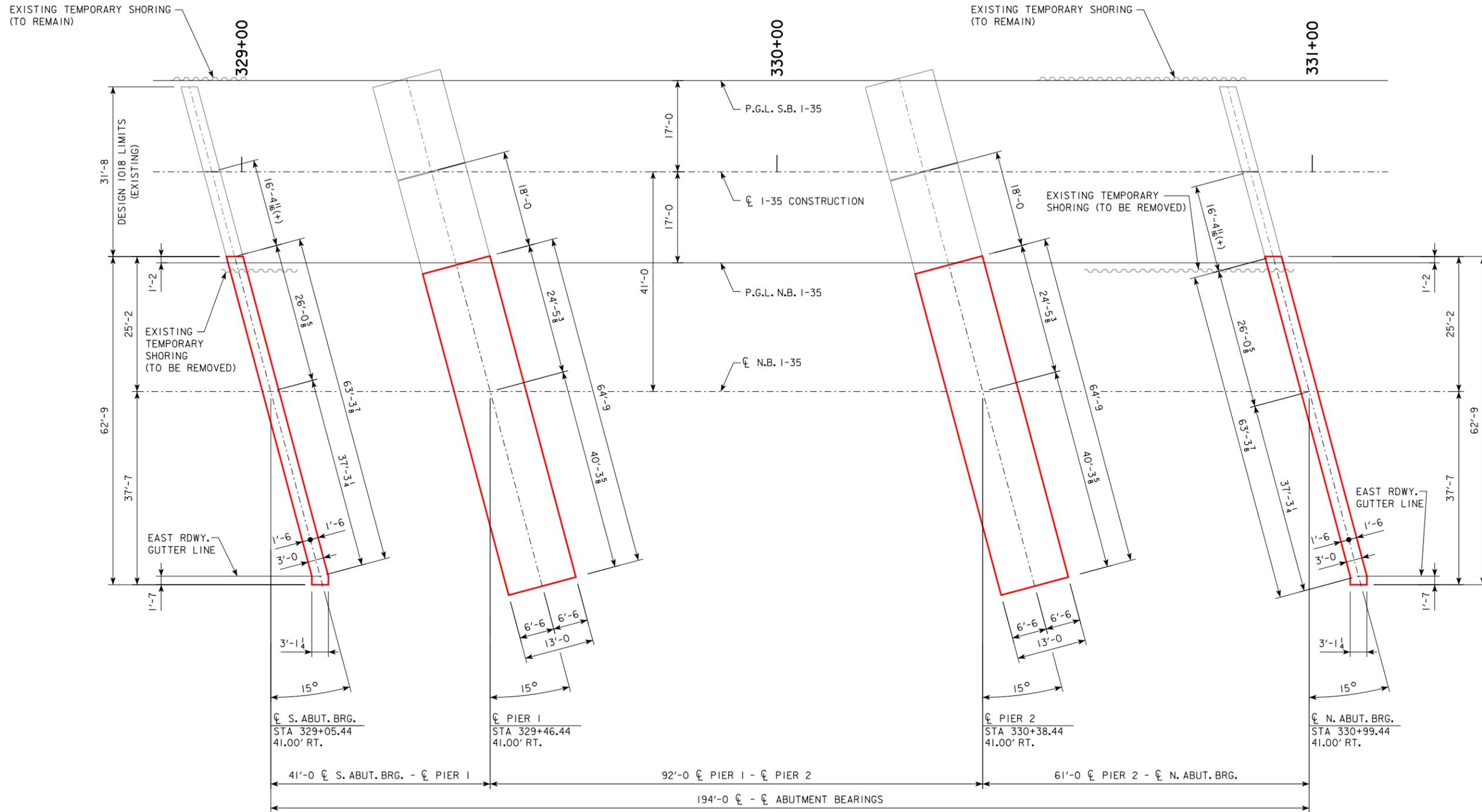
**STAGE A**

STAGE A  
BUILD 31'-8" SEGMENT OF BRIDGE BETWEEN EXISTING BRIDGES, WHILE MAINTAINING NORMAL 4 LANE TRAFFIC ON EXISTING ROADWAY.

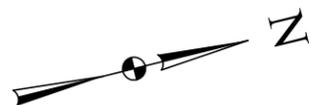
**STAGE B**

STAGE B  
SHIFT NORTHBOUND TRAFFIC ON NEW "CENTER" BRIDGE SEGMENT. REMOVE EXISTING NORTHBOUND BRIDGE AND CONSTRUCT REMAINING PORTION OF NORTHBOUND BRIDGE. MAINTAIN SOUTHBOUND TRAFFIC ON EXISTING SOUTHBOUND BRIDGE.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0" x 75'-4"  
 41'-0" AND 61'-0" END SPANS      92'-0" INTERIOR SPAN  
**STAGING**  
 STATION 330+02.44 41.00' RT. (STAGE B)      MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 6 OF 36      FILE NO. 30451      DESIGN NO. 1118

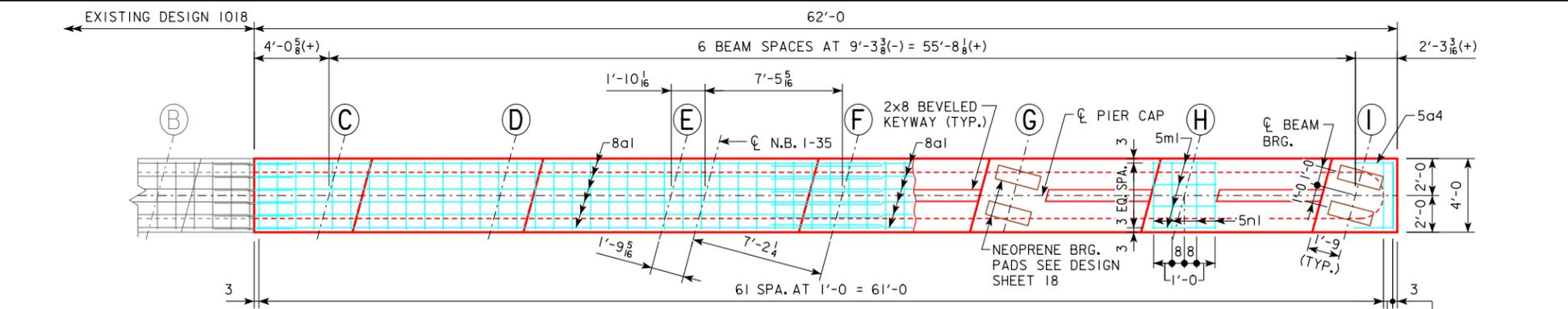


STAKING DIAGRAM

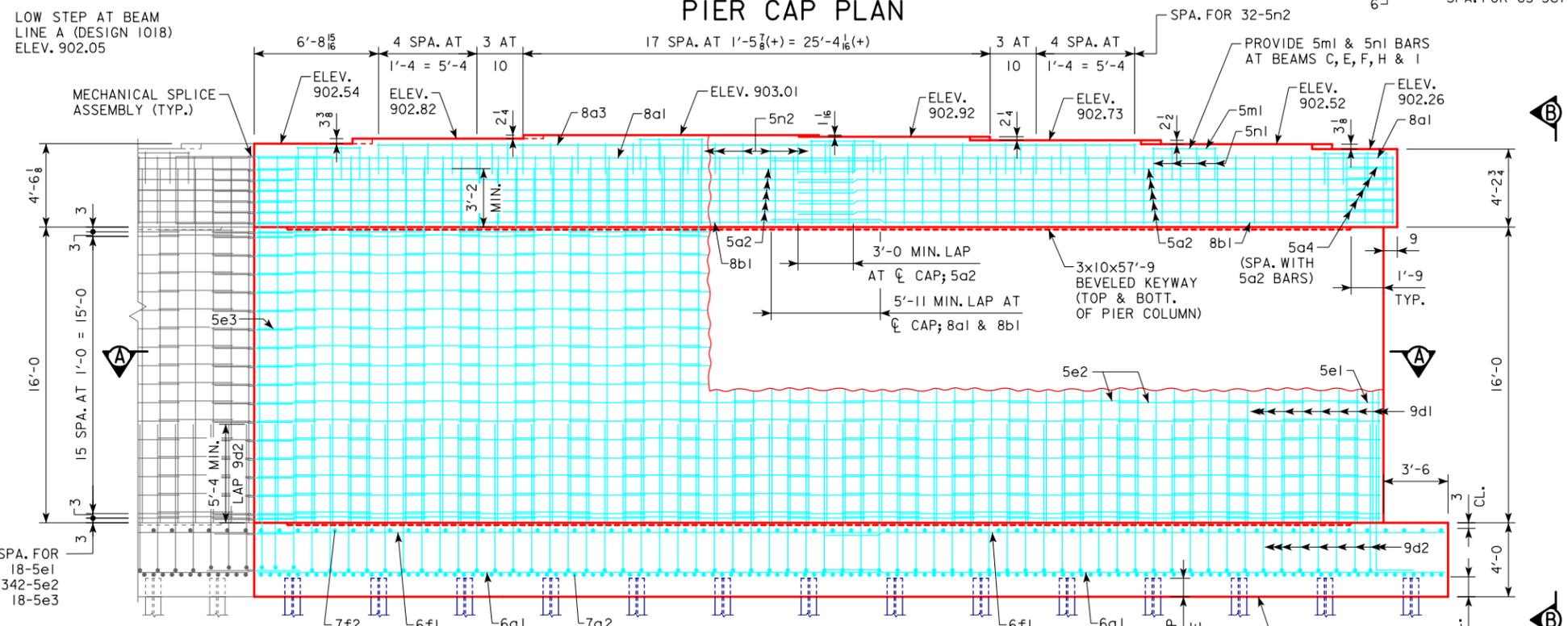


DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**STAKING DIAGRAM**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 7 OF 36 FILE NO. 30451 DESIGN NO. 1118

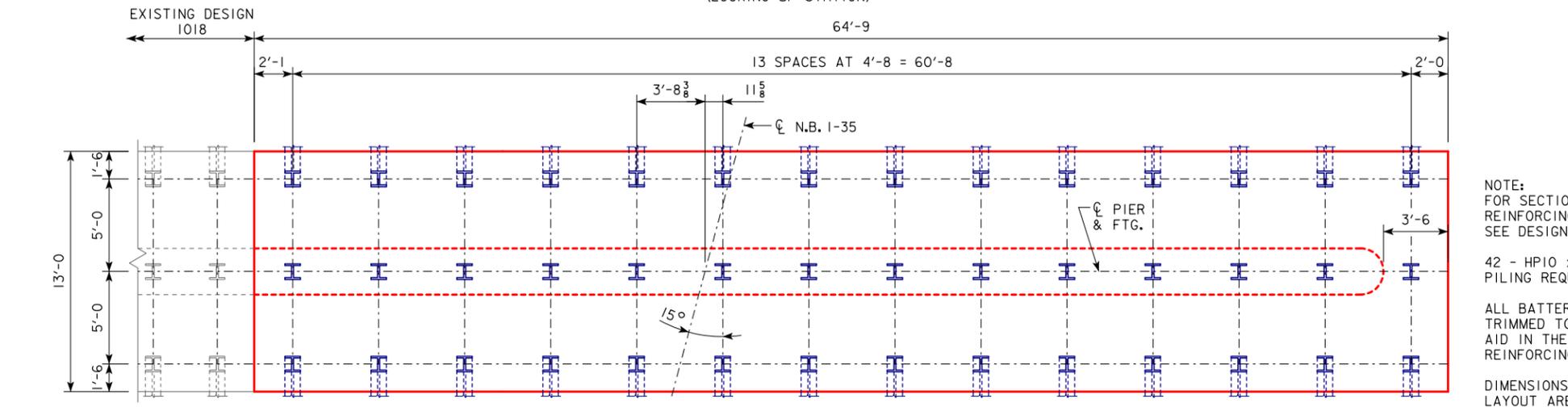
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"X36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"X36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



PIER CAP PLAN

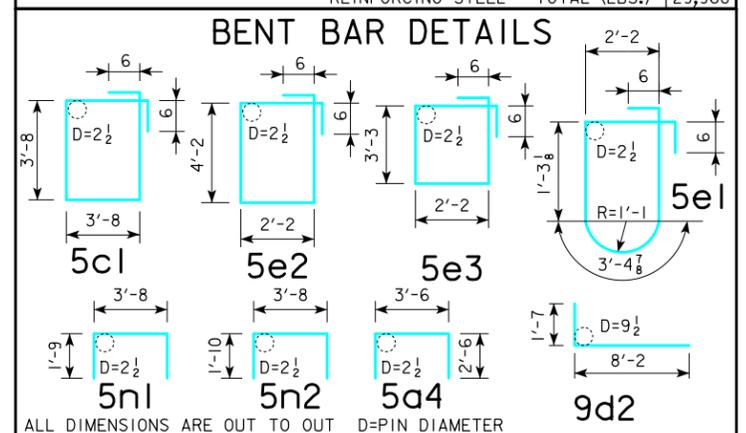


PIER ELEVATION  
(LOOKING UP STATION)



FOOTING PLAN

REINFORCING BAR LIST- PIER 1					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	CAP, LONGITUDINAL, TOP		12	33'-10	1084
5a2	CAP, LONGITUDINAL, SIDE		20	32'-4	674
8a3	CAP, LONGITUDINAL, TOP		4	41'-3	441
5a4	CAP, HAIRPIN, END		5	8'-6	44
8b1	CAP, LONGITUDINAL, BOTTOM		8	33'-10	723
5c1	CAP, HOOPS		63	15'-8	1029
9d1	COLUMN, VERTICAL		128	19'-2	8341
9d2	COLUMN, VERTICAL, DOWELS		128	9'-9	4243
5e1	COLUMN HOOPS, END		18	9'-2	172
5e2	COLUMN HOOPS		342	13'-8	4875
5e3	COLUMN HOOPS, END		18	11'-10	222
6f1	FOOTING, LONGITUDINAL, TOP		26	33'-8	1315
7f2	FOOTING, TRANSVERSE, TOP		65	12'-8	1683
6g1	FOOTING, LONGITUDINAL, BOTTOM		26	33'-8	1315
7g2	FOOTING, TRANSVERSE, BOTTOM		129	12'-8	3340
5ml	CAP, STEP, LONGITUDINAL		20	3'-6	73
5n1	CAP, STEP, TRANSVERSE		20	7'-2	149
5n2	CAP, STEP, TRANSVERSE		32	7'-4	245
REINFORCING STEEL - TOTAL (LBS.)					29,968



CONCRETE PLACEMENT QUANTITIES	
LOCATION	QUANTITY
CAP	43.5
COLUMN	90.4
FOOTING	124.8
TOTAL (CY)	258.7

NOTE:  
FOR SECTION A-A, B-B, FOOTING REINFORCING PLAN, AND PIER NOTES SEE DESIGN SHEET 9.

NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

42 - HPI0 x 57 STEEL BEARING PILING REQUIRED AT PIER 1.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN THE PLACEMENT OF REINFORCING.

DIMENSIONS SHOWN ON PILING LAYOUT ARE AT THE BOTTOM OF FOOTING. BATTER PILES 1:4 IN DIRECTION SHOWN.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**PIER 1 DETAILS - PLAN & ELEV.**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 8 OF 36 FILE NO. 30451 DESIGN NO. 1118

### PIER NOTES:

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED.

ALL EXPOSED CORNERS 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

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

THE 9d2 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE 8a1, 5a2, AND 8b1 IN THE PIER CAP, THE 5e3 BARS IN THE PIER COLUMN, AND 6f1 AND 6g1 IN THE FOOTING, SHALL BE SPLICED AT THE STAGE CONSTRUCTION JOINT USING MECHANICAL SPLICE ASSEMBLIES. MECHANICAL SPLICE ASSEMBLIES CONSIST OF MECHANICAL SPLICERS AND REINFORCING SPLICE BARS AS REQUIRED TO FACILITATE THE USE OF THE MECHANICAL SPLICER. THE MECHANICAL SPLICE ASSEMBLY USED SHALL MEET THE REQUIREMENTS OF MATERIALS IM 451 APPENDIX E. REINFORCING SPLICE BARS SHALL MATCH SIZE OF BAR TO BE SPLICED.

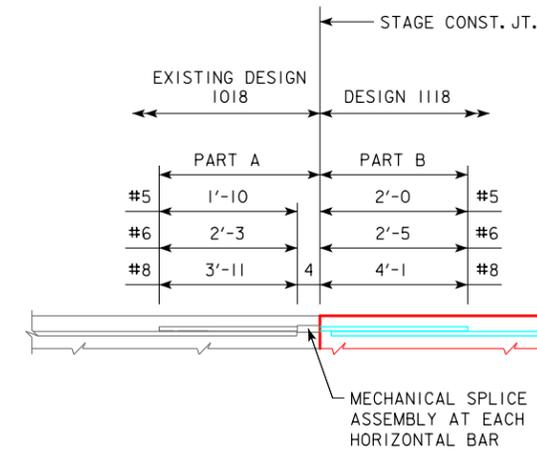
THE COST OF ALL SPLICE ASSEMBLIES IS TO BE INCLUDED IN THE PRICE BID FOR "REINFORCING STEEL" AND NO SEPARATE PAYMENT WILL BE MADE. THE WEIGHT OF MECHANICAL SPLICE ASSEMBLIES IS NOT INCLUDED IN THE QUANTITY SHOWN FOR "REINFORCING STEEL". A TOTAL OF 10 - #8 IN PIER CAP, 10 - #5 IN PIER CAP, 36 - #5 IN PIER COLUMN, AND 26 - #6 IN FOOTING SPLICE ASSEMBLIES WILL BE REQUIRED FOR EACH PIER.

### PIER I PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 60 FEET FOR THE PIER I PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 124 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.77. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

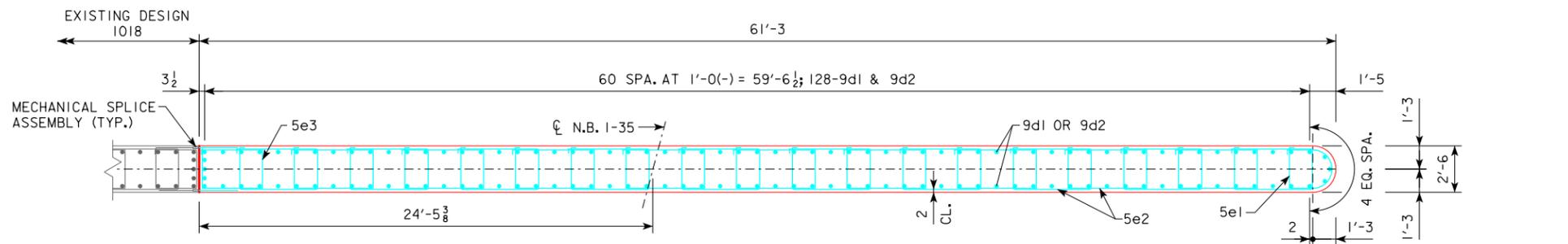
THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER I PILES IS 81 TONS AT END OF DRIVE. IF RETAPS ARE NECESSARY TO ACHIEVE BEARING, THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE IS 96 TONS AT ONE-DAY OR LATER RETAPS. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



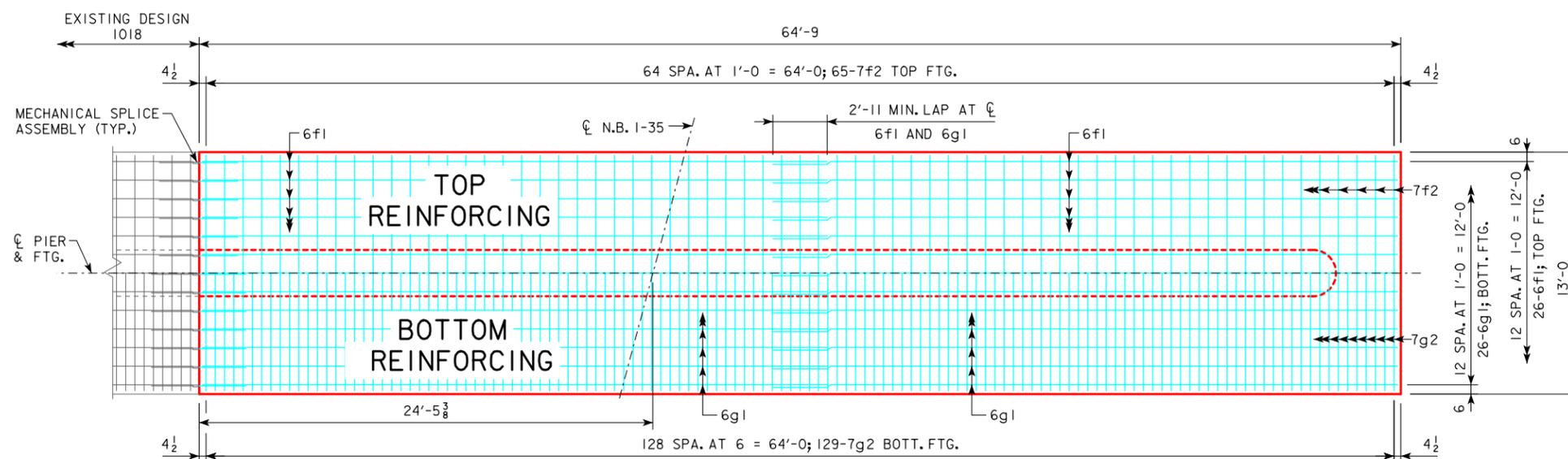
### DETAIL OF MECHANICAL SPLICE ASSEMBLIES

MECHANICAL SPLICE ASSEMBLY PART A WAS INSTALLED IN DESIGN 1018. MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118.

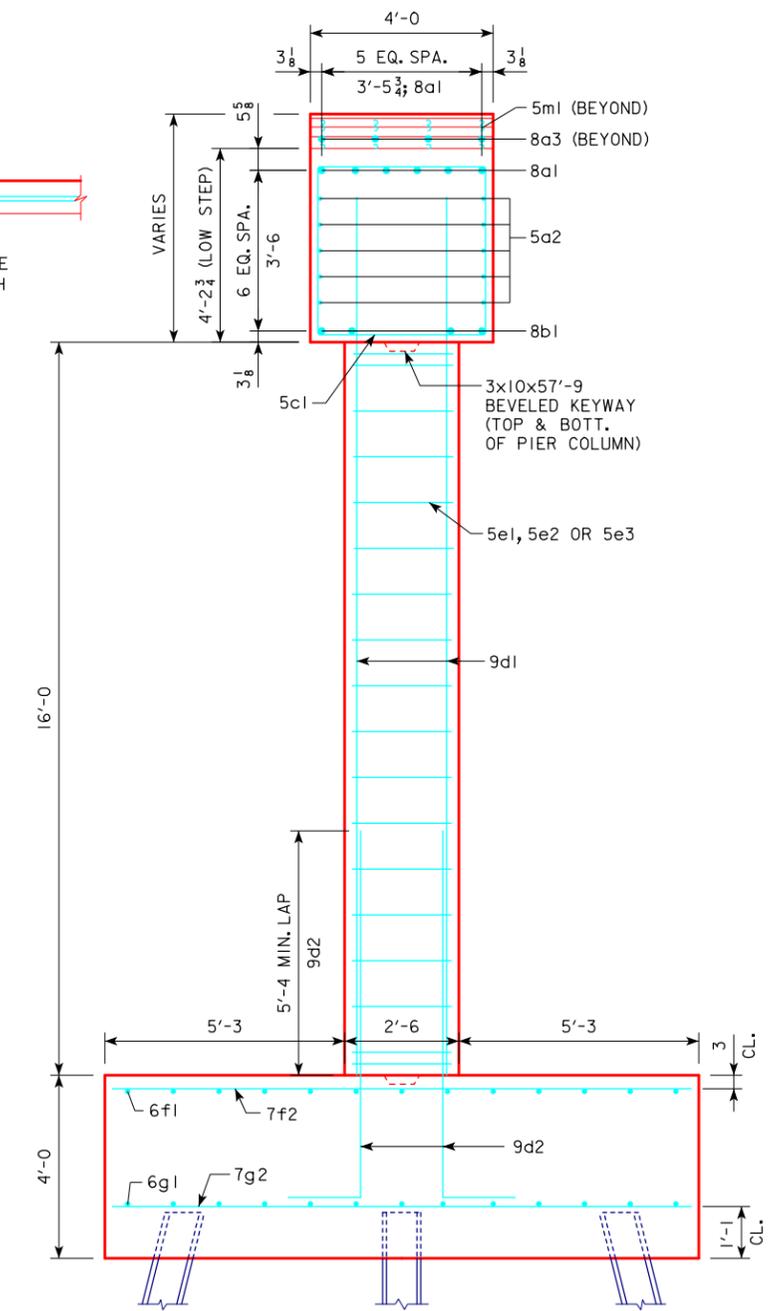
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



SECTION A-A



FOOTING PLAN



SECTION B-B

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS x 92'-0 INTERIOR SPAN  
**PIER I DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 9 OF 36 FILE NO. 30451 DESIGN NO. 1118



**PIER NOTES:**

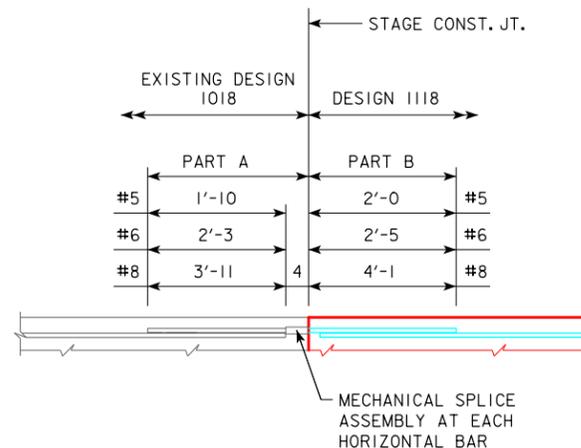
FOR PIER NOTES SEE DESIGN SHEET 9.

**PIER 2 PILE DRIVING NOTES:**

THE CONTRACT LENGTH OF 60 FEET FOR THE PIER 2 PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 128 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.77. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

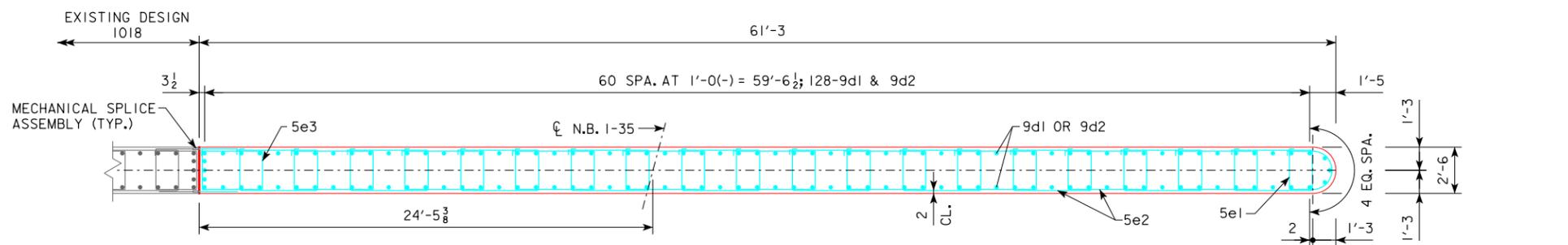
THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER 2 PILES IS 83 TONS AT END OF DRIVE. IF RETAPS ARE NECESSARY TO ACHIEVE BEARING, THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE IS 99 TONS AT ONE-DAY OR LATER RETAPS. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



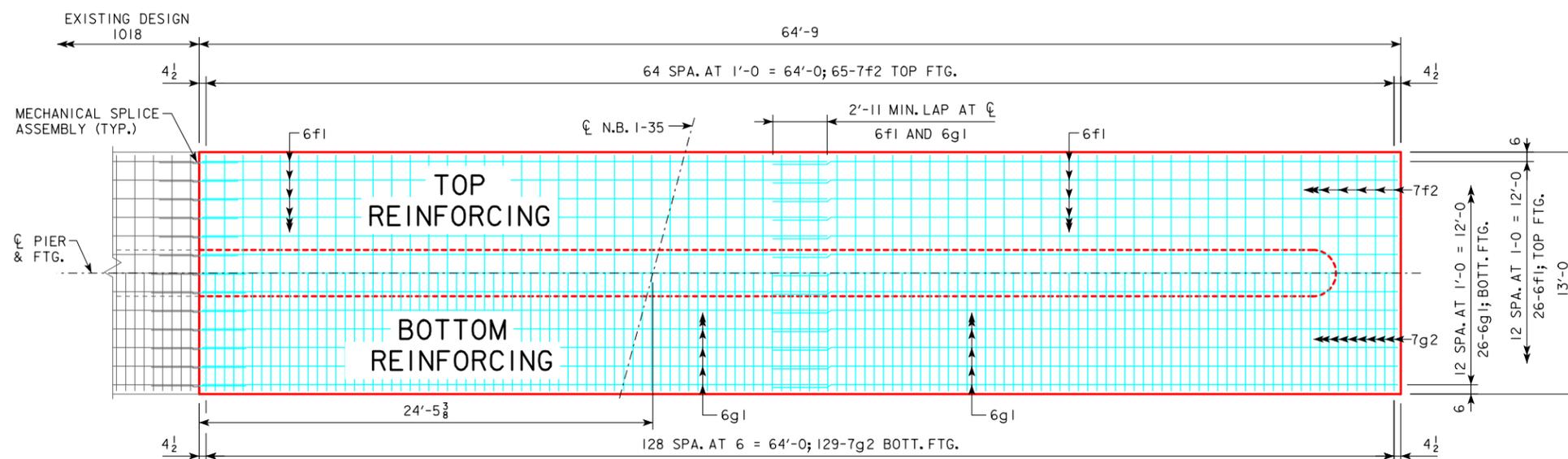
**DETAIL OF MECHANICAL SPLICE ASSEMBLIES**

MECHANICAL SPLICE ASSEMBLY PART A WAS INSTALLED IN DESIGN 1018. MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118.

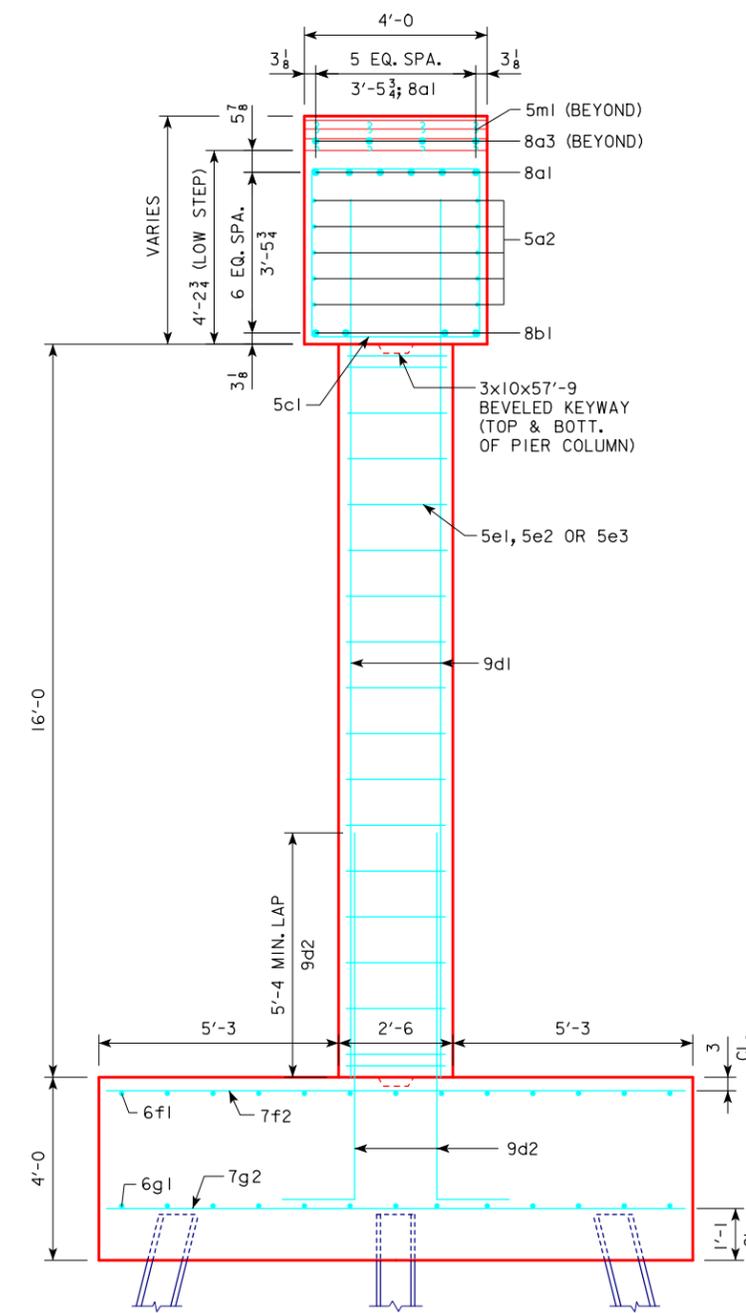
BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



**SECTION A-A**



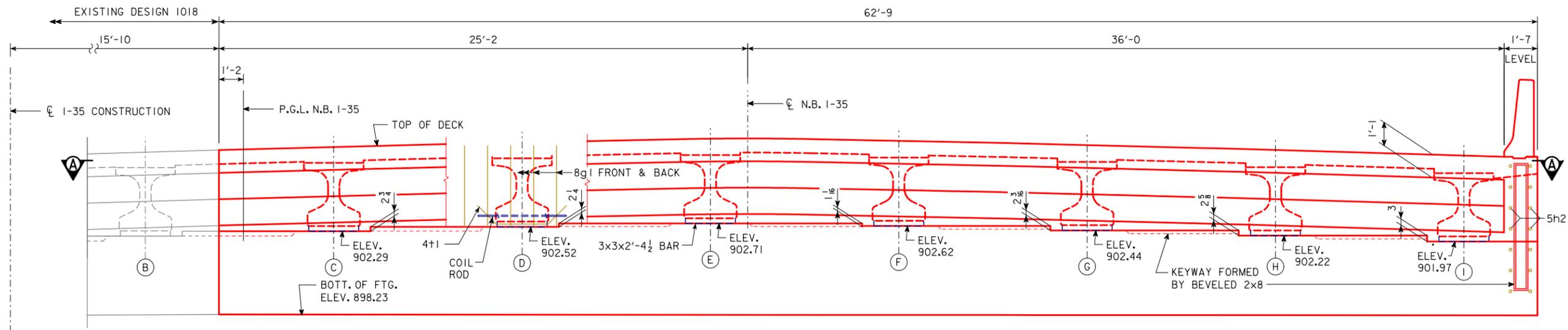
**FOOTING PLAN**



**SECTION B-B**

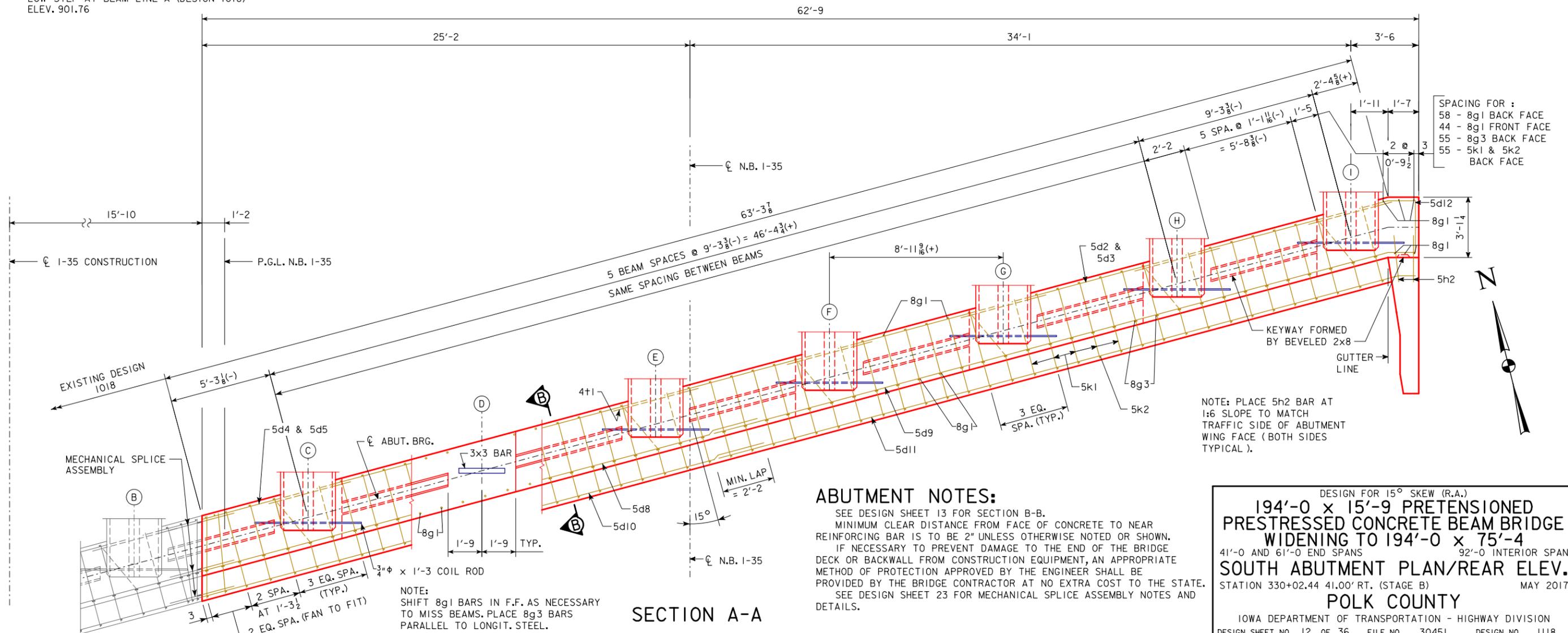
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**PIER 2 DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 11 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



REAR ELEVATION AT ABUTMENT

LOW STEP AT BEAM LINE A (DESIGN 1018)  
 ELEV. 901.76



**ABUTMENT NOTES:**

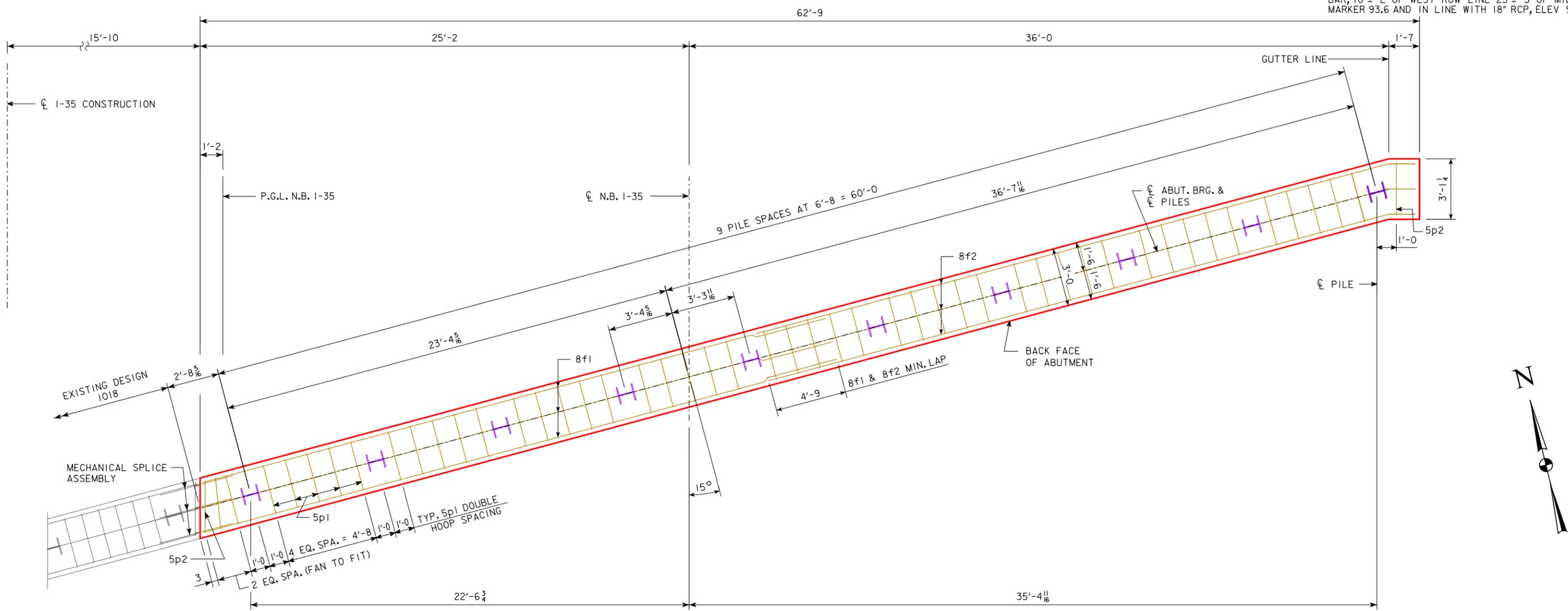
SEE DESIGN SHEET 13 FOR SECTION B-B.  
 MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.  
 IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE STATE.  
 SEE DESIGN SHEET 23 FOR MECHANICAL SPLICE NOTES AND DETAILS.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0" x 75'-4"**  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**SOUTH ABUTMENT PLAN/REAR ELEV.**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 12 OF 36 FILE NO. 30451 DESIGN NO. 1118

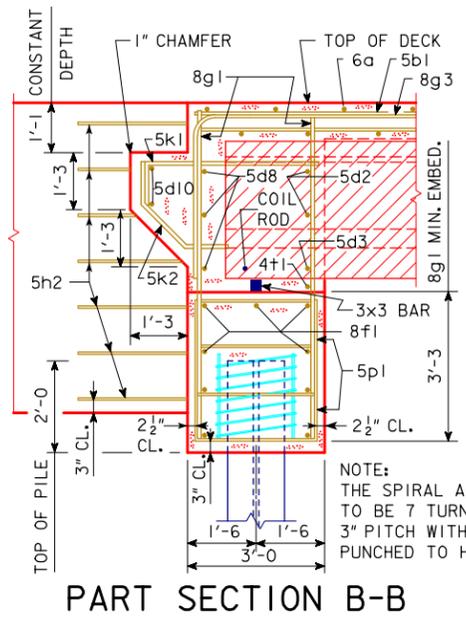
SECTION A-A

NOTE:  
 SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



ABUTMENT PILE PLAN



PART SECTION B-B

ABUTMENT CONCRETE QUANTITY	
LOCATION	QUANTITY
SOUTH ABUTMENT FOOTING	30.5
TOTAL (CU. YDS.)	30.5

NOTE: CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.  
 NOTE:  
 10 - HP 10 x 57 STEEL BEARING PILING REQUIRED AT EACH ABUTMENT.  
 NOTE: BARRIER RAIL NOT SHOWN IN DETAILS.  
 NOTE:  
 SEE DESIGN SHEET 12 FOR LOCATION OF SECTION B-B.  
 SEE DESIGN SHEET 23 FOR MECHANICAL SPLICE ASSEMBLY NOTES AND DETAILS.

**SOUTH ABUTMENT PILE DRIVING NOTES:**

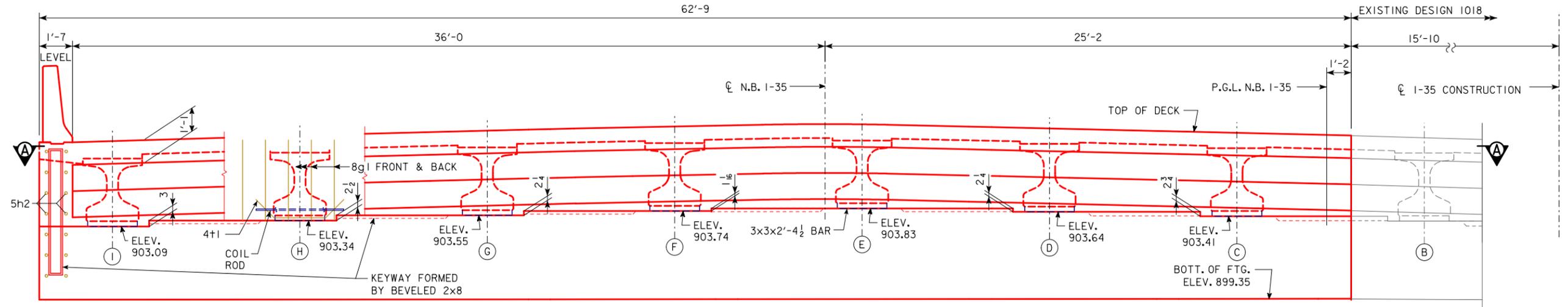
THE CONTRACT LENGTH OF 75 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 118 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWNDRAG LOAD OF 3 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 92 TONS AT END OF DRIVE. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

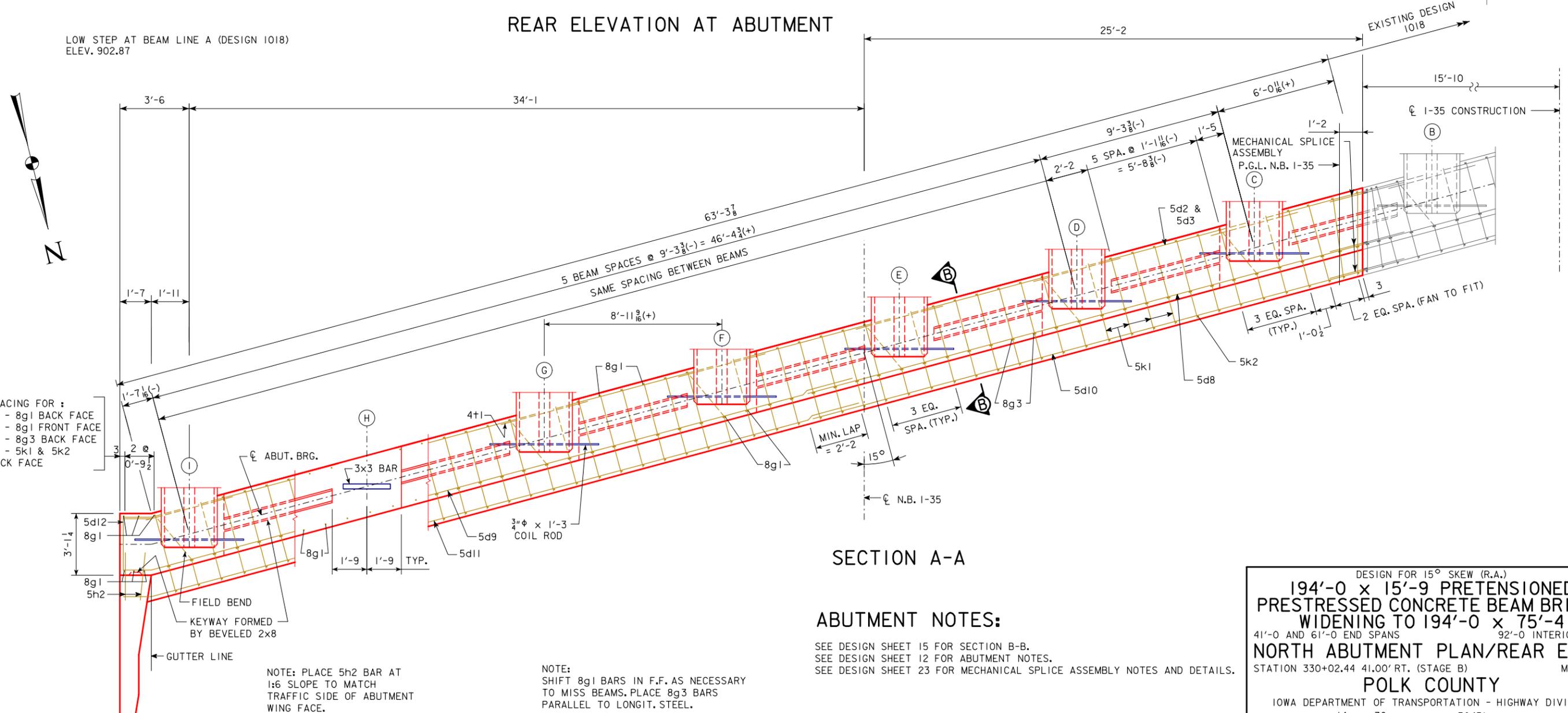
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SOUTH ABUTMENT PILE PLAN**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 13 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38. BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



REAR ELEVATION AT ABUTMENT

LOW STEP AT BEAM LINE A (DESIGN 1018)  
ELEV. 902.87



SECTION A-A

ABUTMENT NOTES:

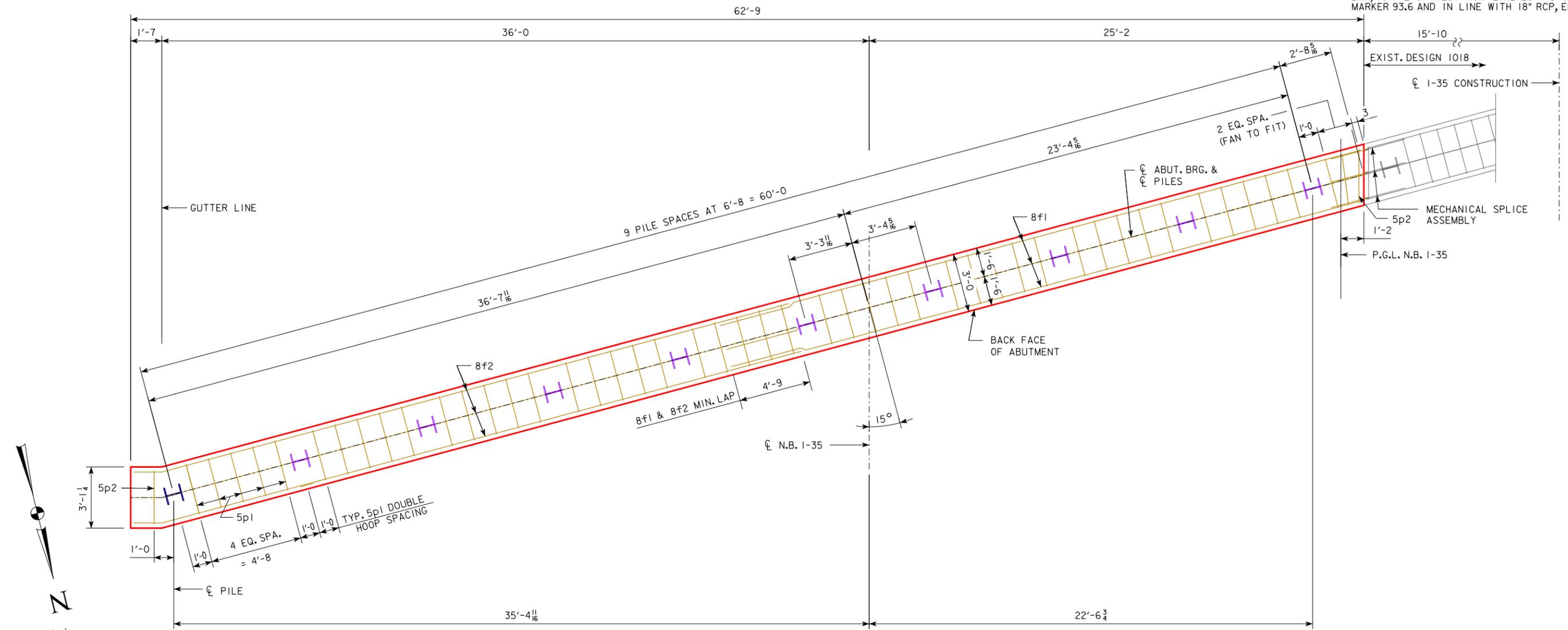
SEE DESIGN SHEET 15 FOR SECTION B-B.  
SEE DESIGN SHEET 12 FOR ABUTMENT NOTES.  
SEE DESIGN SHEET 23 FOR MECHANICAL SPLICE ASSEMBLY NOTES AND DETAILS.

NOTE: PLACE 5h2 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE.

NOTE: SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**NORTH ABUTMENT PLAN/REAR ELEV.**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 14 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"X36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"X36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



ABUTMENT PILE PLAN

ABUTMENT CONCRETE QUANTITY	
LOCATION	QUANTITY
NORTH ABUTMENT FOOTING	30.5
TOTAL (CU. YDS.)	30.5

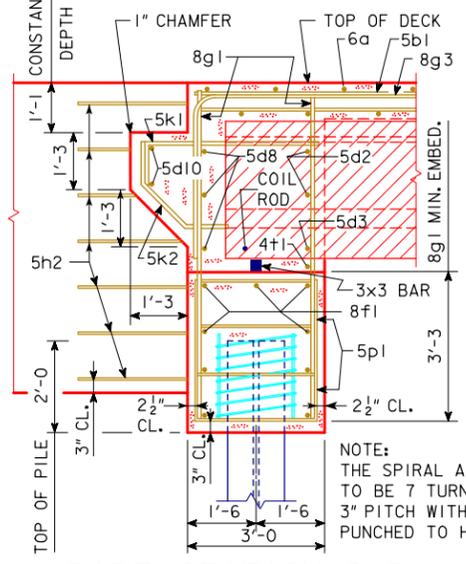
NOTE: CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.  
 NOTE:  
 10 - HP 10 x 57 STEEL BEARING PILING REQUIRED AT EACH ABUTMENT.  
 NOTE: BARRIER RAIL NOT SHOWN IN DETAILS.  
 NOTE:  
 SEE DESIGN SHEET 14 FOR LOCATION OF SECTION B-B.  
 SEE DESIGN SHEET 23 FOR MECHANICAL SPLICE ASSEMBLY NOTES AND DETAILS.

**NORTH ABUTMENT PILE DRIVING NOTES:**

THE CONTRACT LENGTH OF 100 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 158 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWNDRAG LOAD OF 20 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 131 TONS AT END OF DRIVE. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



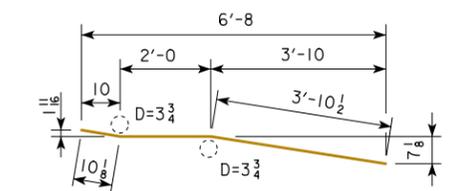
PART SECTION B-B

NOTE:  
 THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF No. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - 1 1/8 x 7/8 x 1/8 SPACERS PUNCHED TO HOLD SPIRAL.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**NORTH ABUTMENT PILE PLAN**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 15 OF 36 FILE NO. 30451 DESIGN NO. 1118

### REINFORCING BAR LIST - ONE ABUT. WING

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5h1	HORIZONTAL BACK FACE		7	6'-8	49
5h3	HORIZONTAL TRAFFIC FACE		7	6'-9	49
5s1	VERTICAL BOTH FACES		16	6'-0	100
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					198

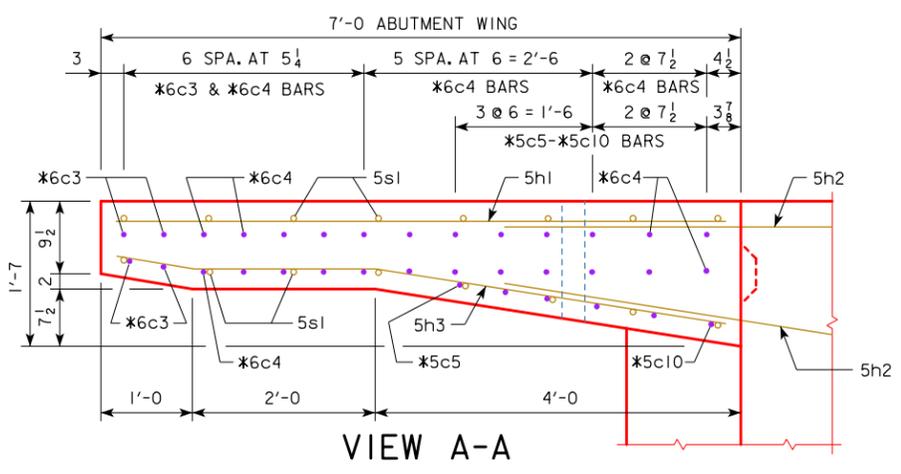


**5h3**  
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.  
**BENT BAR DETAILS**

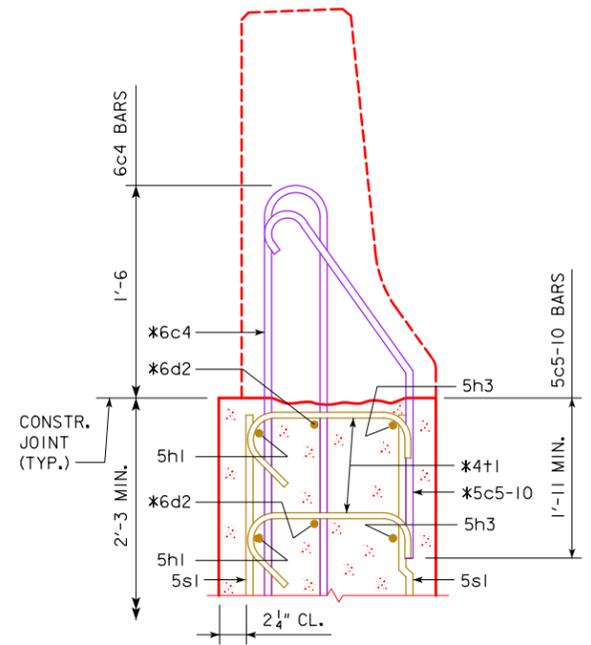
### CONCRETE PLACEMENT SUMMARY

CONCRETE	TOTAL
ONE ABUTMENT WING	1.9
<b>TOTAL (CU. YDS.)</b>	<b>1.9</b>

**NOTE:**  
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

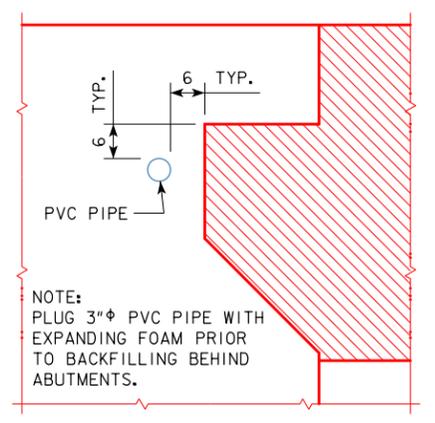


NOTE:  
PLUG 3"  $\phi$  PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.



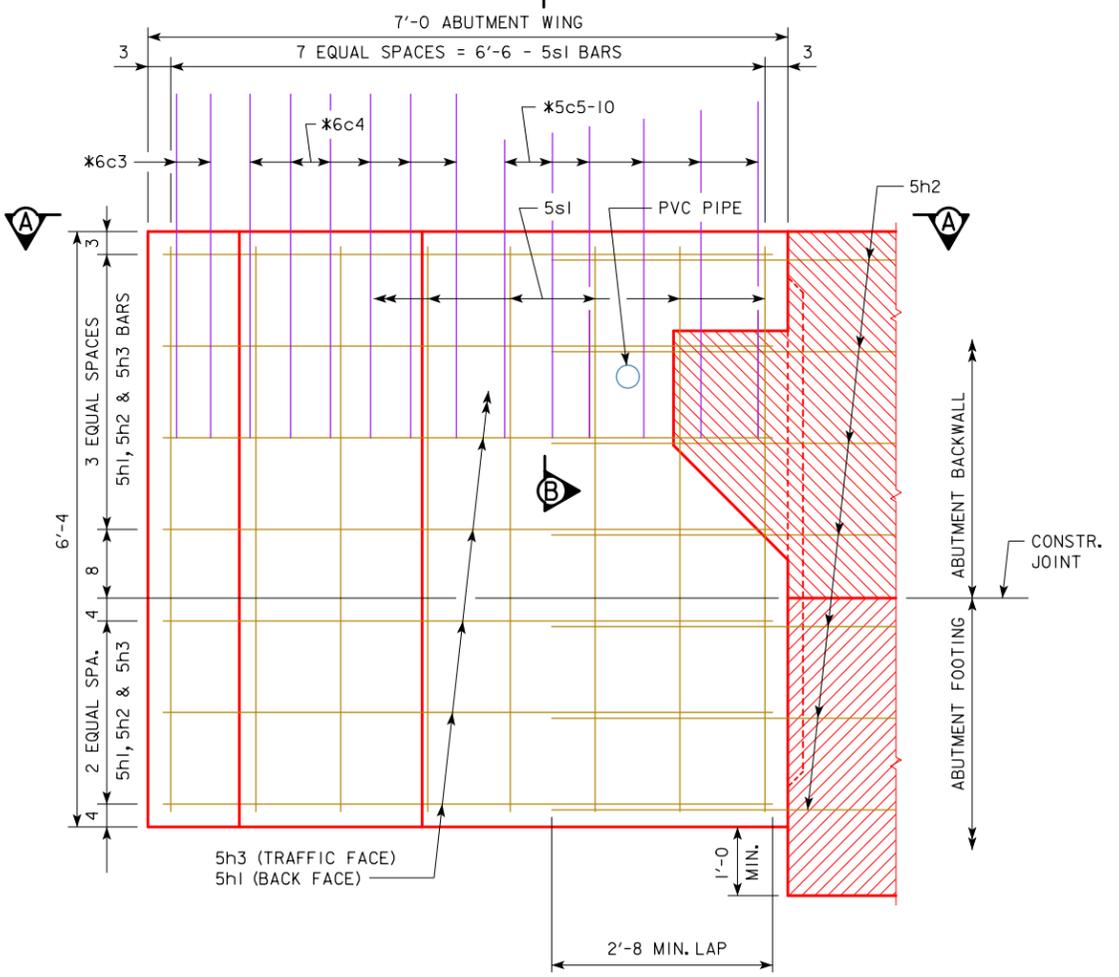
### SECTION B-B

\* BARRIER RAIL END SECTION BARS TO BE PLACED WITH ABUTMENT WING.  
SEE BARRIER RAIL END SECTION SHEET IN THESE PLANS FOR DETAILS OF REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1.



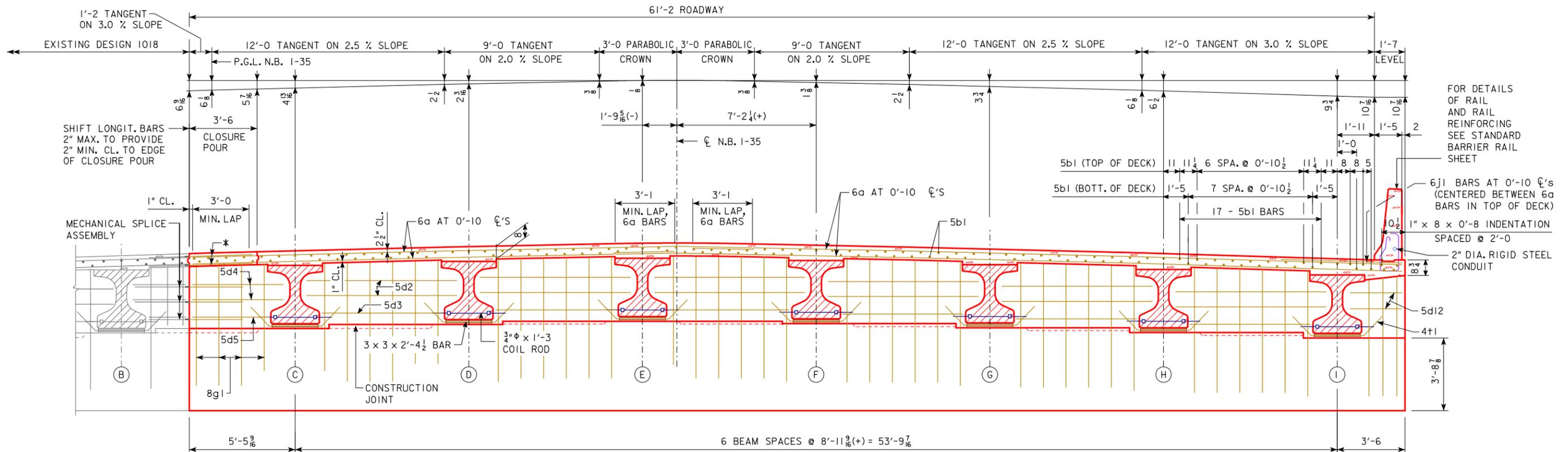
### PVC PIPE LOCATION

NOTE:  
PLUG 3"  $\phi$  PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

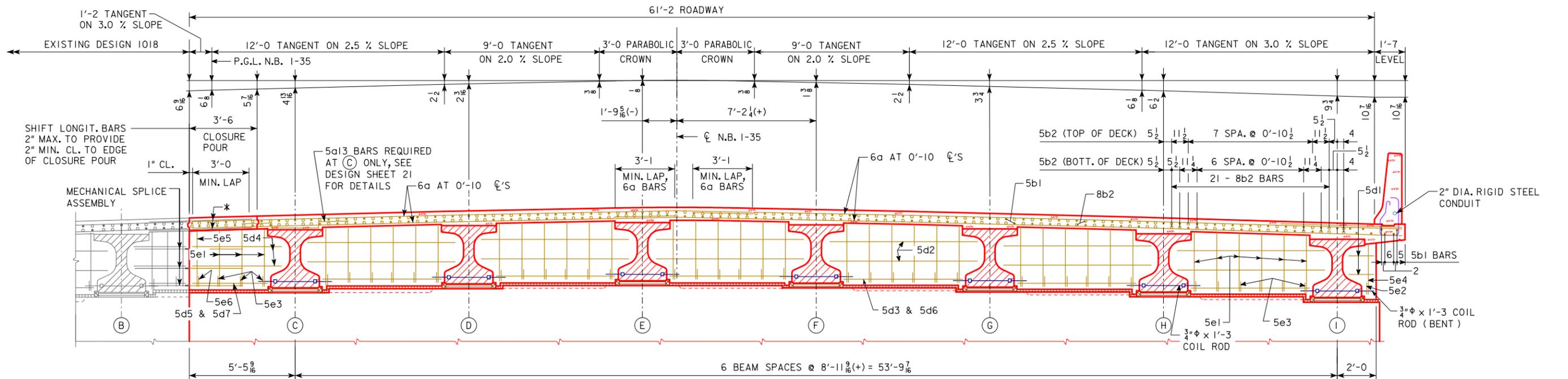


### ABUTMENT WING - ELEVATION VIEW

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
PRESTRESSED CONCRETE BEAM BRIDGE**  
WIDENING TO 194'-0 x 75'-4  
41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**ABUTMENT WING DETAILS**  
STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 16 OF 36 FILE NO. 30451 DESIGN NO. 1118



SECTION NEAR ABUTMENT



SECTION NEAR PIER

**NOTES:**

- SEE DESIGN SHEET 22 FOR TYPICAL DECK AND HAUNCH DETAILS.
- SEE DESIGN SHEET 23 FOR SUPERSTRUCTURE NOTES AND MECHANICAL SPLICE ASSEMBLY DETAILS.
- SEE DESIGN SHEET 30 FOR DETAILS OF INTERMEDIATE DIAPHRAGMS.

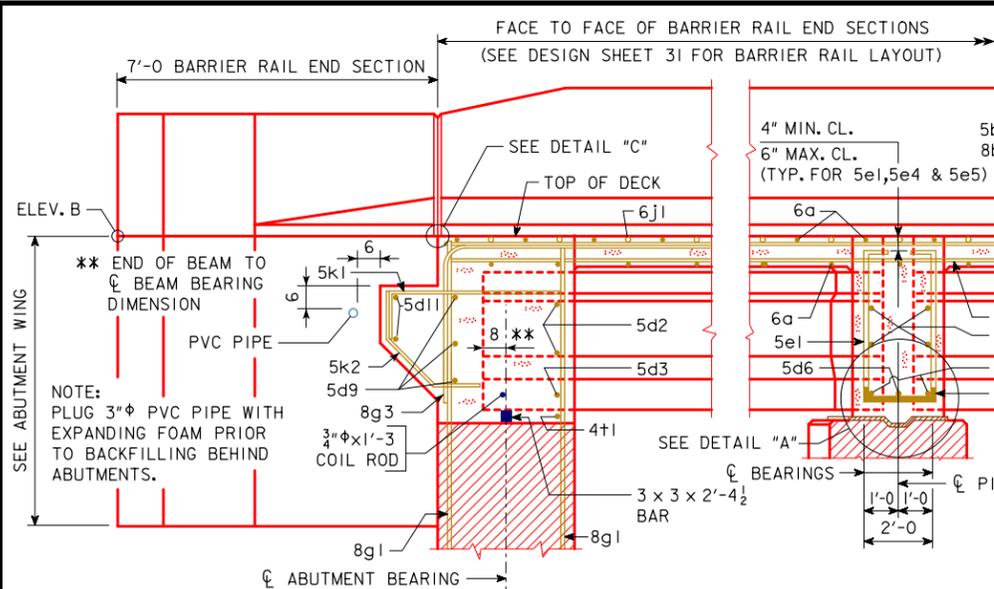
\* MECHANICAL SPLICE ASSEMBLY OR STAINLESS STEEL BAR. SEE DESIGN SHEET 20 FOR LOCATIONS.

NOTE: THE DATUM FOR DECK CROWN ORDINATES IS 0.51 FEET ABOVE THE PROFILE GRADE ELEVATION.

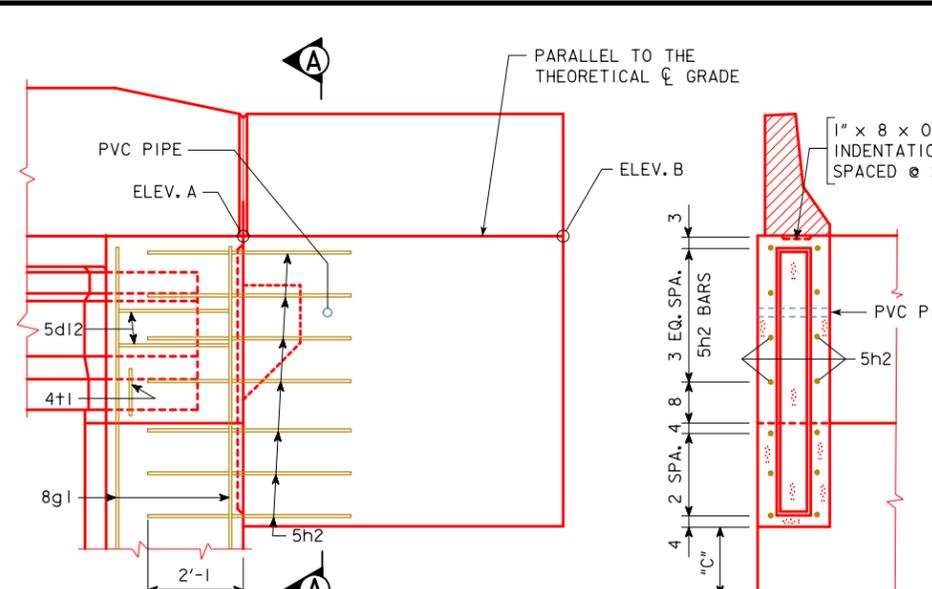
CLOSURE POUR DECK AREA = 2.33 SQ. FT.

DECK AREA = 39.76 SQ. FT. DECK AREA DOES NOT INCLUDE THE HAUNCH.

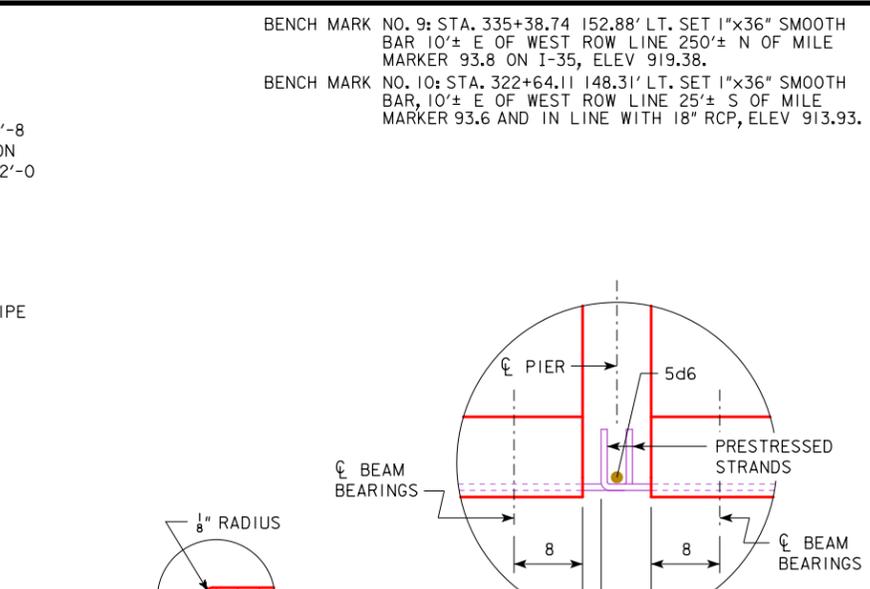
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SUPERSTRUCTURE CROSS SECTIONS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 17 OF 36 FILE NO. 30451 DESIGN NO. 1118



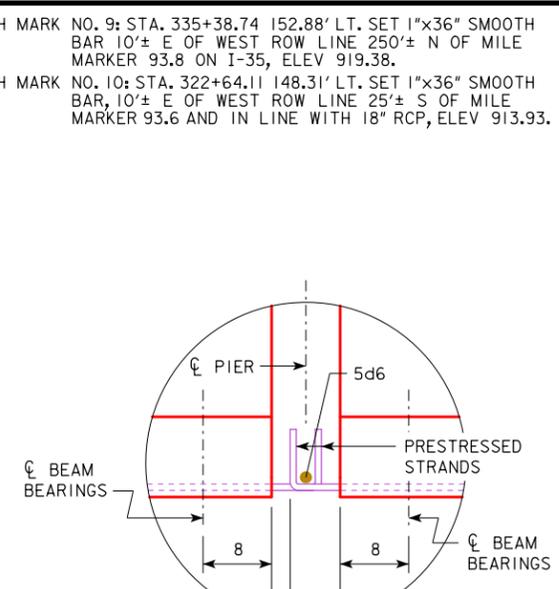
**PART LONGITUDINAL SECTION NEAR GUTTER**  
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEET 30)



**PART END VIEW AT ABUTMENT**

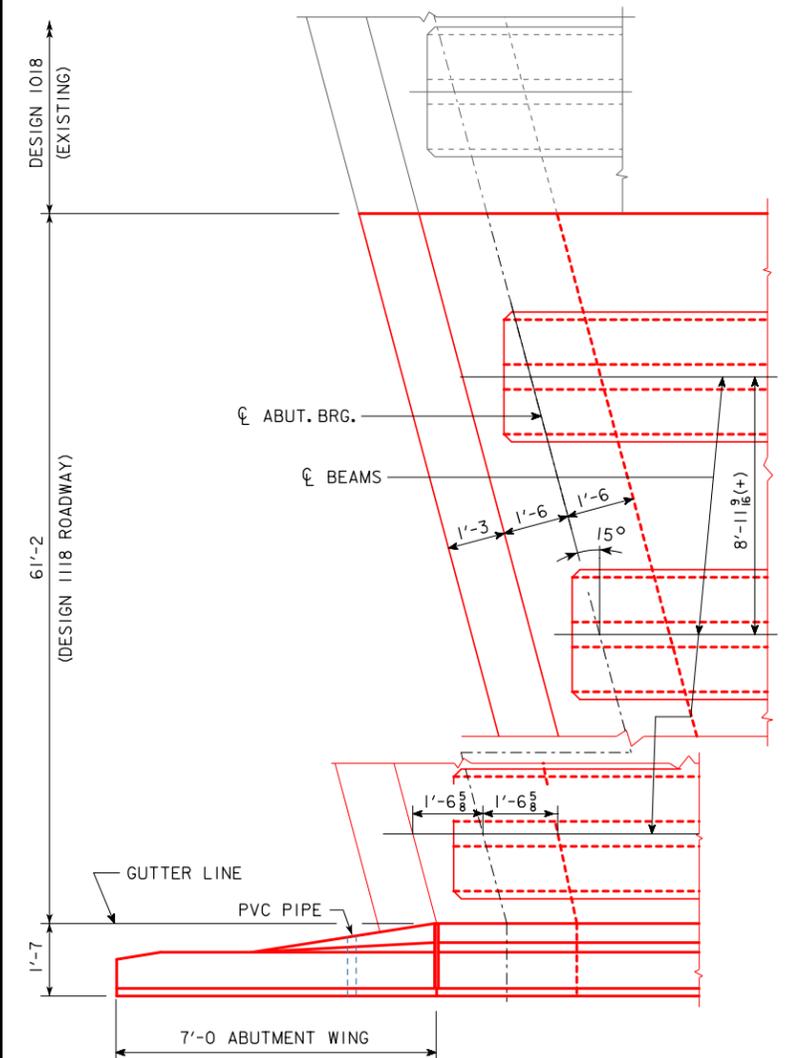


**SECTION A-A**

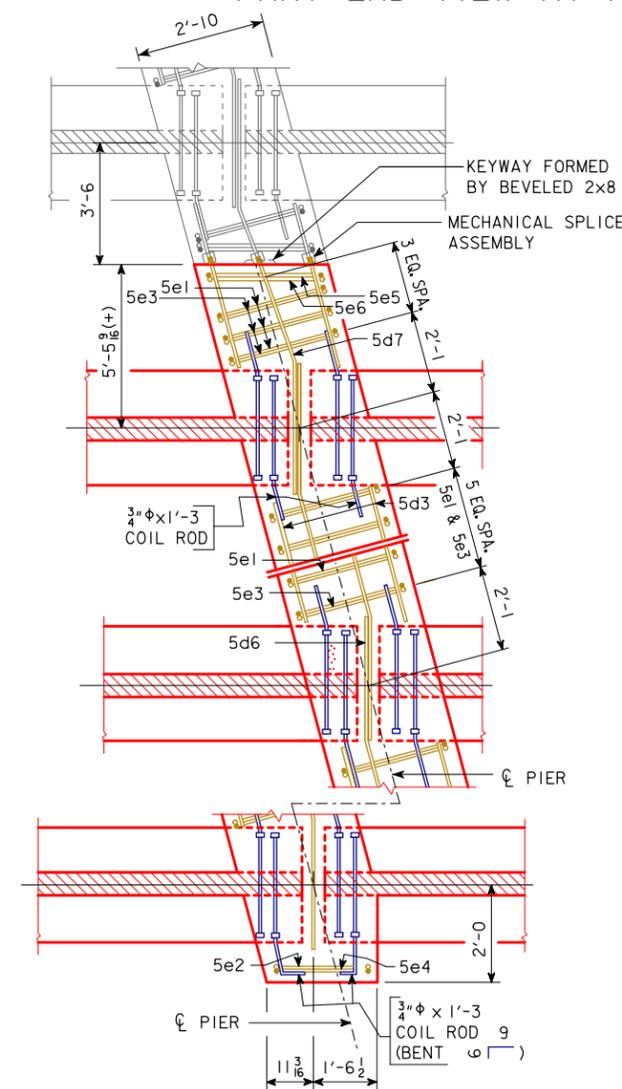


**DETAIL "C"**  
**DETAIL "A"**

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



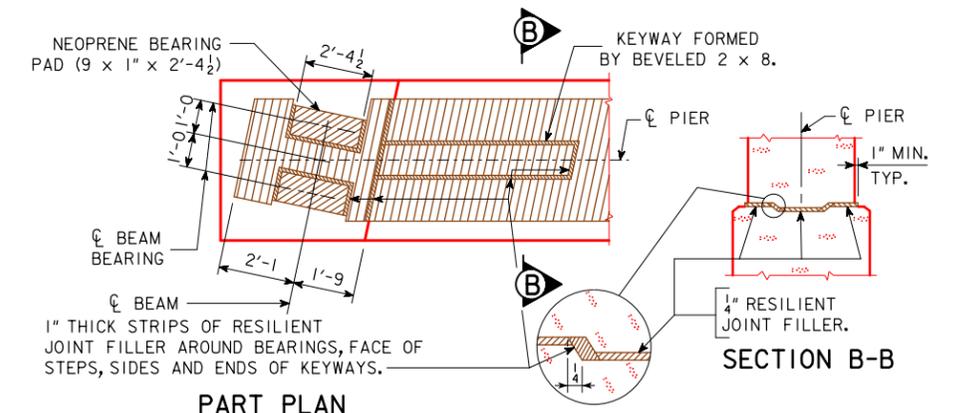
**PART PLAN**



**PART SECTION AT PIER**

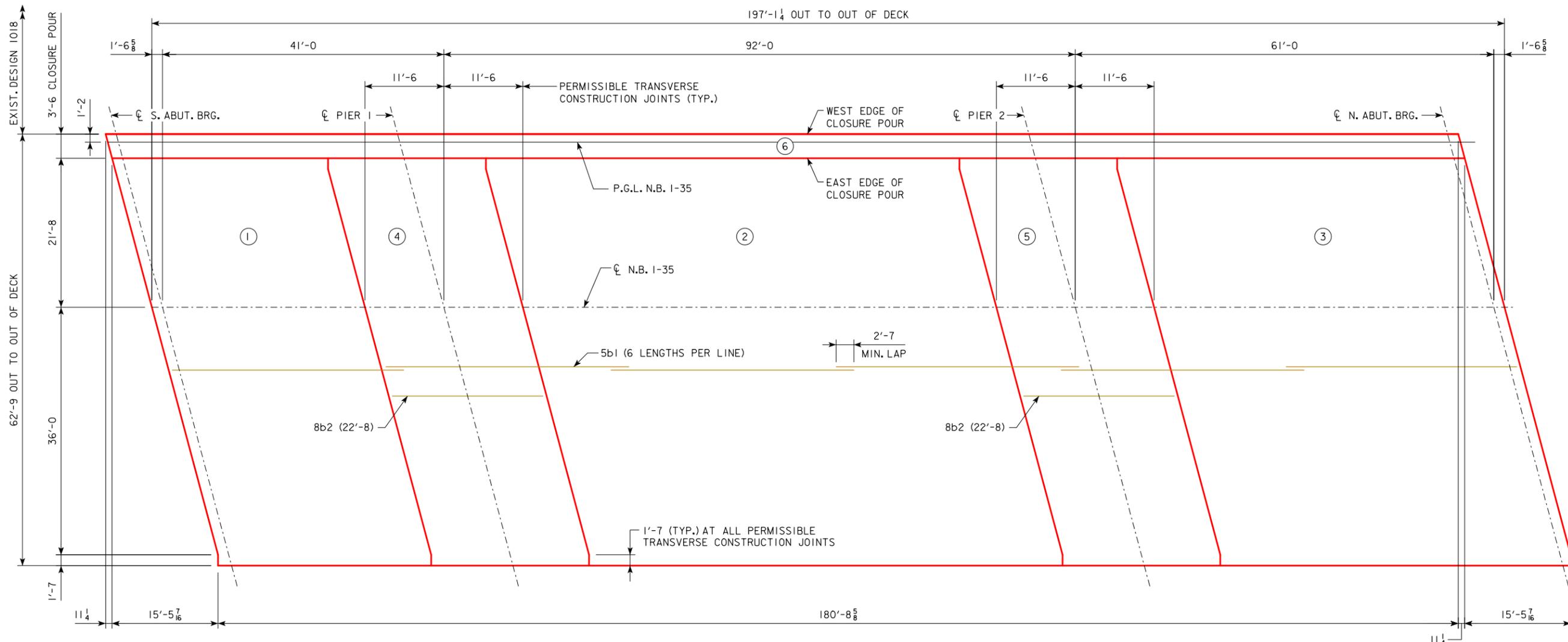
TABLE OF WING ELEVATIONS			
LOCATION	DIM "C"	ELEV. A	ELEV. B
S.E. CORNER	1'-4 1/8	905.95	905.91
N.E. CORNER	1'-5 3/8	907.08	907.13

NOTE: MATERIAL FOR NEOPRENE PADS TO BE OF 70 DUROMETER NEOPRENE.



**PART PLAN**  
**TOP OF PIER DETAILS**

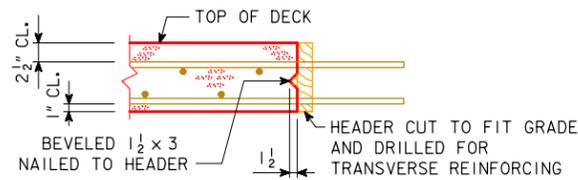
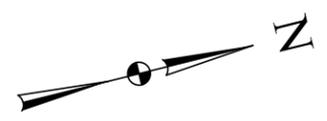
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
PRESTRESSED CONCRETE BEAM BRIDGE  
WIDENING TO 194'-0 x 75'-4**  
41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**LONGITUDINAL SECTION/PART PLAN**  
STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 18 OF 36 FILE NO. 30451 DESIGN NO. 1118



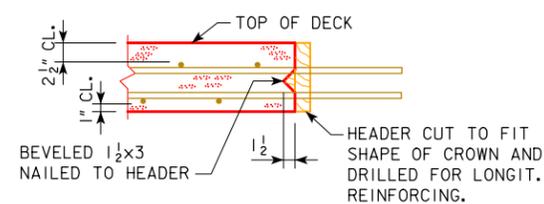
### CONCRETE PLACEMENT DIAGRAM

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

NOTE: CLOSURE POUR TO BE PLACED CONTINUOUSLY FROM END TO END OF THE DECK.



PERMISSIBLE LONGITUDINAL DECK CONSTRUCTION JOINT



PERMISSIBLE TRANSVERSE DECK CONSTRUCTION JOINT

DESIGN FOR 15° SKEW (R.A.)

**194'-0" x 15'-9" PRETENSIONED  
PRESTRESSED CONCRETE BEAM BRIDGE**

**WIDENING TO 194'-0" x 75'-4"**

41'-0" AND 61'-0" END SPANS      92'-0" INTERIOR SPAN

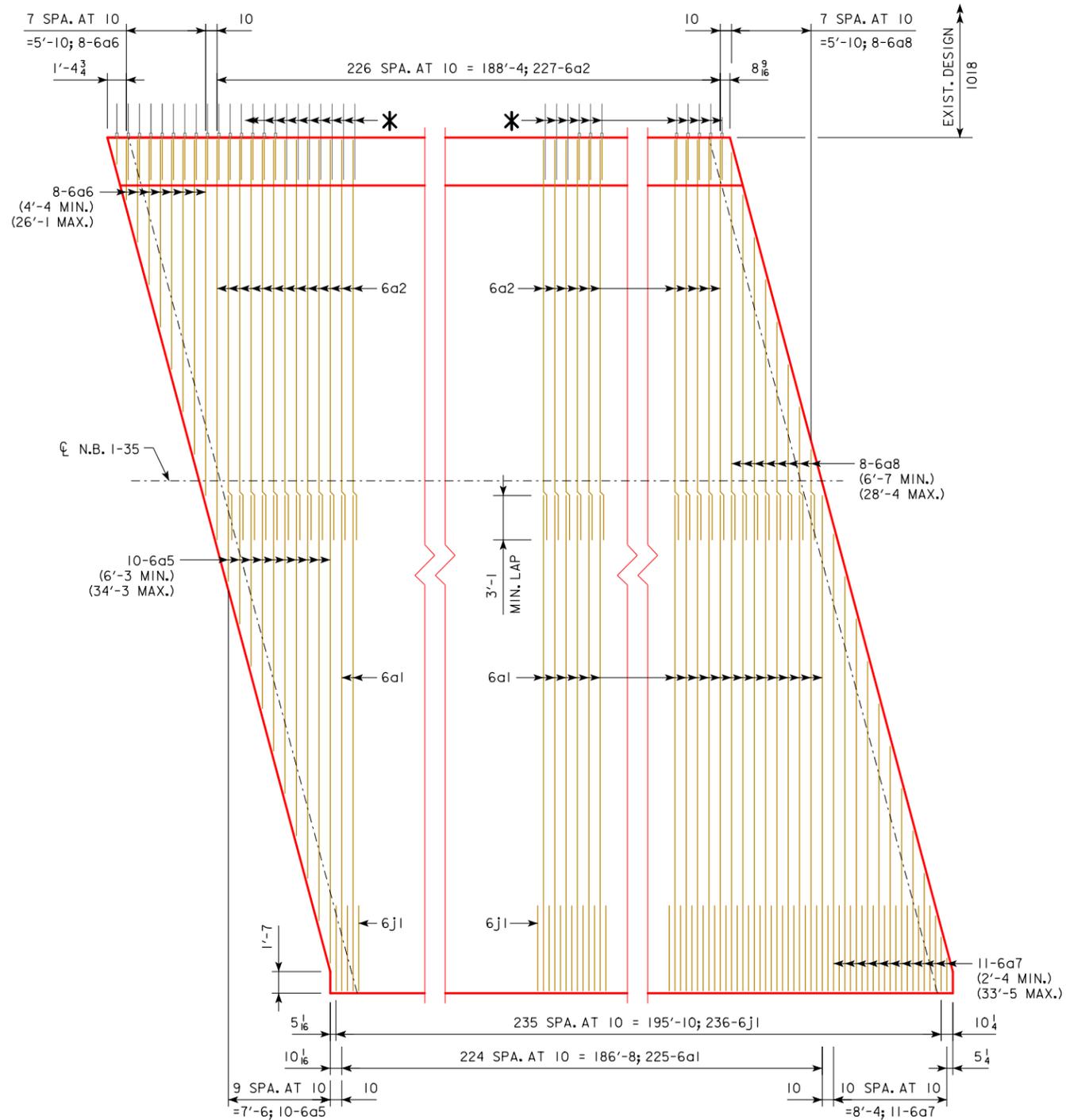
**CONCRETE PLACEMENT/DECK REINF.**

STATION 330+02.44 41.00' RT. (STAGE B)      MAY 2017

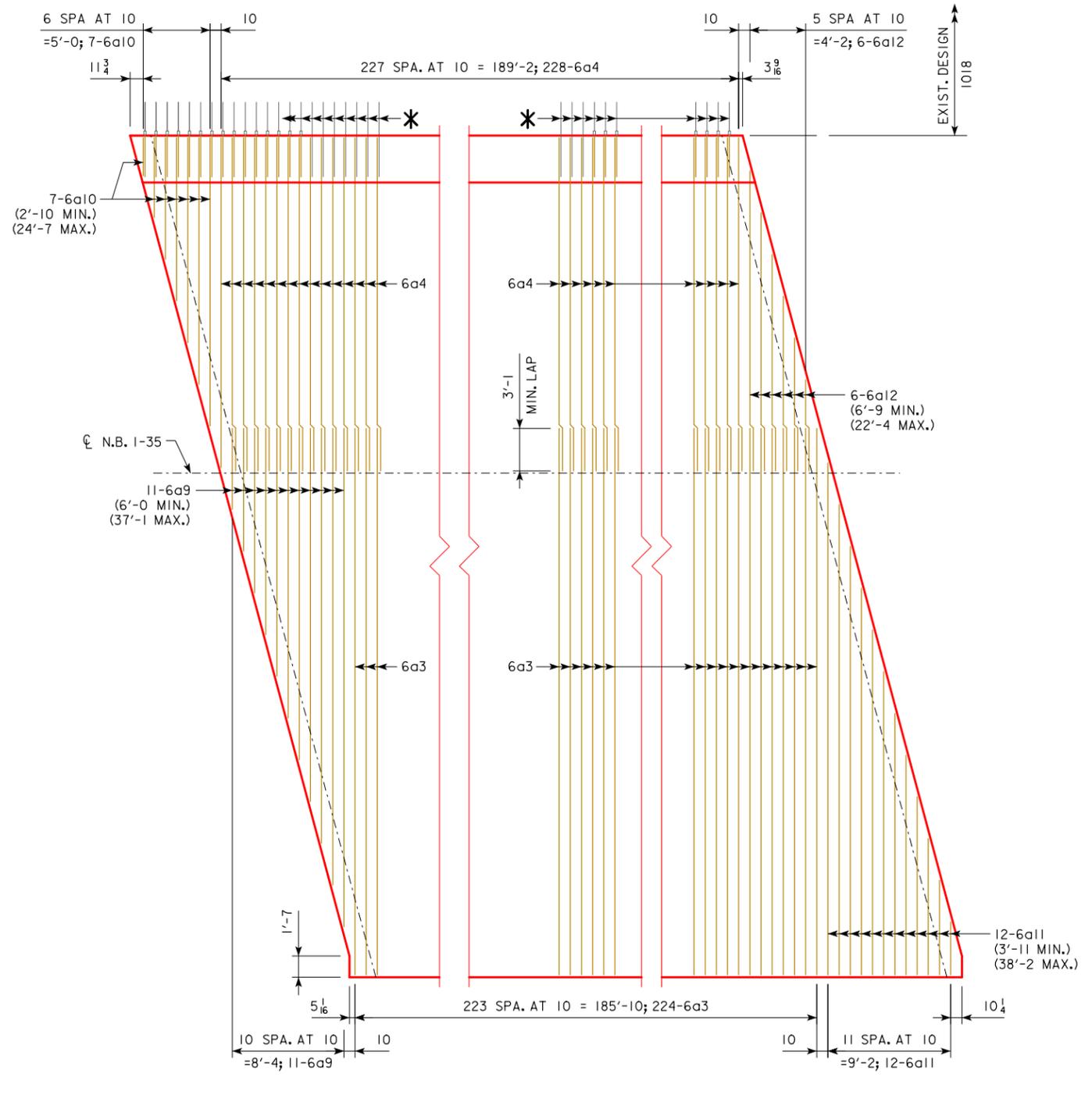
**POLK COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

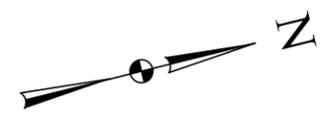
DESIGN SHEET NO. 19 OF 36      FILE NO. 30451      DESIGN NO. 1118



TOP OF DECK TRANSVERSE REINFORCING STEEL LAYOUT

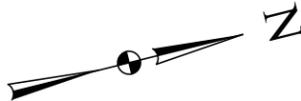
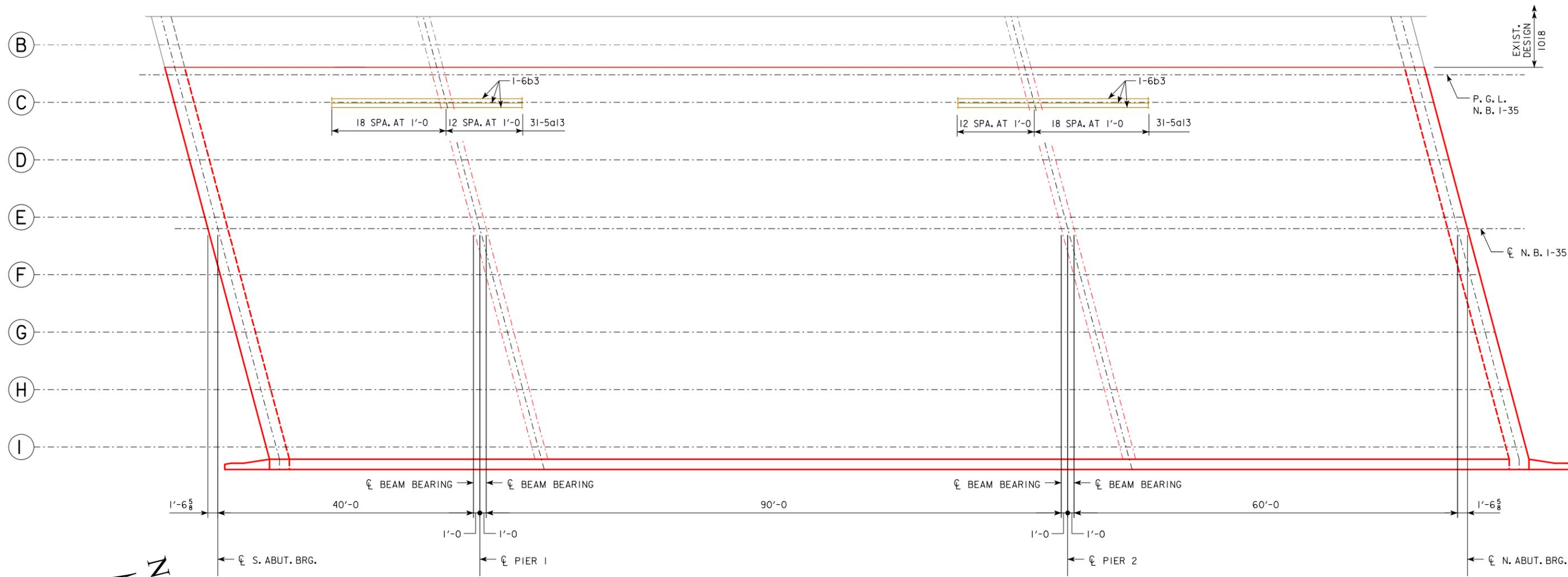


BOTTOM OF DECK TRANSVERSE REINFORCING STEEL LAYOUT

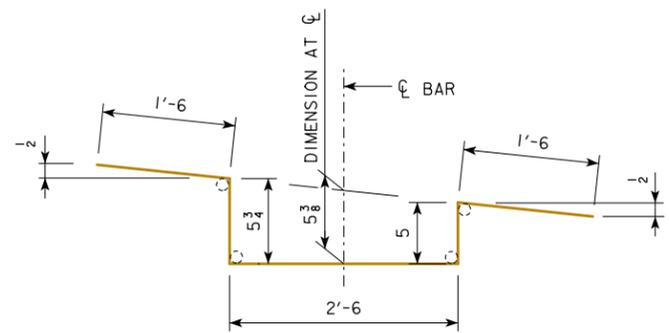


\* LAP BAR WITH MECHANICAL SPLICE ASSEMBLY OR STAINLESS STEEL BAR PROJECTING FROM EXISTING DECK.

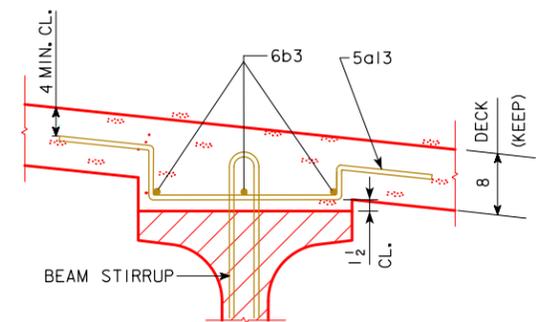
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**TRANSVERSE DECK REINFORCING**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 20 OF 36 FILE NO. 30451 DESIGN NO. 1118



SUPPLEMENTAL HAUNCH REINFORCING LAYOUT



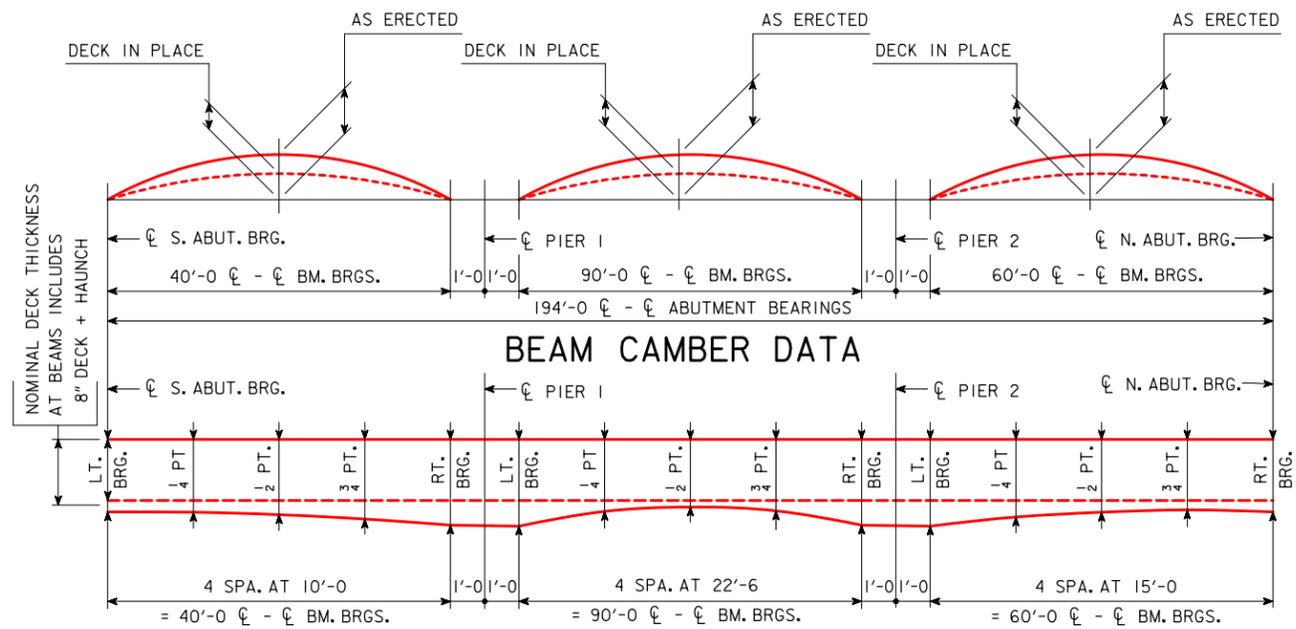
TYPICAL 5a13  
LOOKING UPSTATION



SECTION THRU DECK HAUNCH

TYPICAL AT LOCATIONS INDICATED  
ON SUPPLEMENTAL HAUNCH REINFORCING LAYOUT.  
NOTE:  
THE 5a13 BARS MAY BE TILTED AS NECESSARY TO FIT UNDER THE TOP OF  
DECK REINFORCING MAT AND MAINTAIN THE 4" MINIMUM DIMENSION SHOWN.

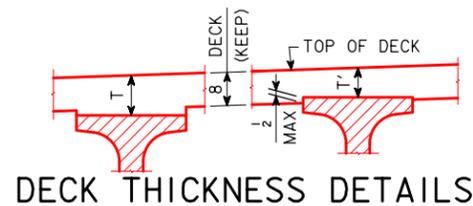
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SUPPLEMENTAL HAUNCH REINFORCING**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 21 OF 36 FILE NO. 30451 DESIGN NO. 1118



BEAM CAMBER DATA

DECK THICKNESS AT BEAMS (T)

BEAM LINE	SPAN 1					SPAN 2					SPAN 3				
	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.	LT. BRG.	1/4 PT.	1/2 PT.	3/4 PT.	RT. BRG.
C	9 1/2	9 9/16	9 7/8	10 7/16	11 1/4	11 3/8	9 8/16	8 7/16	9 1/16	11 1/4	11 3/8	10 1/8	9 7/16	9 3/16	9 1/2
D & E	9 1/2	9 7/16	9 5/8	10 1/16	10 11/16	10 13/16	9 1/16	8 5/8	9	10 11/16	10 13/16	9 7/8	9 3/8	9 3/16	9 1/2
F, G, H & I	9 1/2	9 7/16	9 5/8	10 1/16	10 11/16	10 13/16	9 1/16	8 5/8	9	10 11/16	10 13/16	9 13/16	9 5/16	9 1/8	9 1/2

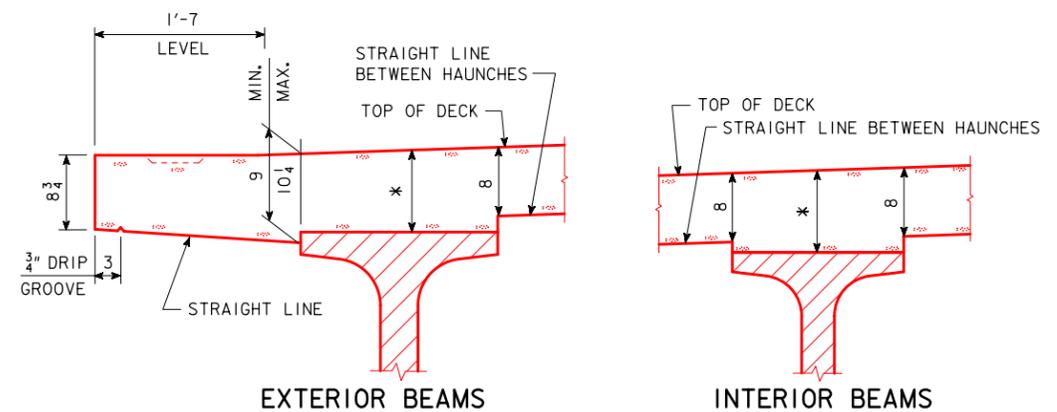


DECK THICKNESS DETAILS

NOTE: THE DECK THICKNESS (T) AT BEAMS IS BASED ON THE ANTICIPATED BEAM CAMBER AND DEFLECTIONS. THESE VALUES ARE USED BY THE DESIGNER TO SET BEAM ELEVATIONS AND ESTIMATE CONCRETE QUANTITIES. REFER TO THE HAUNCH DATA DETAILS SHEET FOR ADDITIONAL INFORMATION TO AID THE CONTRACTOR IN SETTING THE FIELD HAUNCHES REQUIRED FOR CONSTRUCTION.

BEAM LINE	SPAN 1		SPAN 2		SPAN 3	
	AS ERECTED	DECK IN PLACE	AS ERECTED	DECK IN PLACE	AS ERECTED	DECK IN PLACE
C	5/8	1/2	4 13/16	2 7/8	1 9/16	1
D, E, F, G, H & I	5/8	7/16	4 13/16	2 1/8	1 9/16	13/16

BEAM CAMBER DATA



EXTERIOR BEAMS

INTERIOR BEAMS

TYPICAL DECK AND HAUNCH DETAIL

\* FOR DECK THICKNESS OVER BEAMS SEE HAUNCH AND CAMBER DETAILS ON THIS SHEET.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0" x 75'-4"  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**DECK THICKNESS DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 22 OF 36 FILE NO. 30451 DESIGN NO. 1118

### SUPERSTRUCTURE NOTES:

THE BRIDGE DECK AS SHOWN ON DESIGN SHEET 17 INCLUDES 2" INTEGRAL WEARING SURFACE.  
 THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE BRIDGE DECK.

COST OF ALL RESILIENT JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".  
 ALL BEAMS ARE TO BE SET VERTICAL.

FORMS FOR THE DECK AND BARRIER RAIL ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

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

ALL DECK AND DIAPHRAGM REINFORCING IS TO BE WIRED IN PLACE AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED.

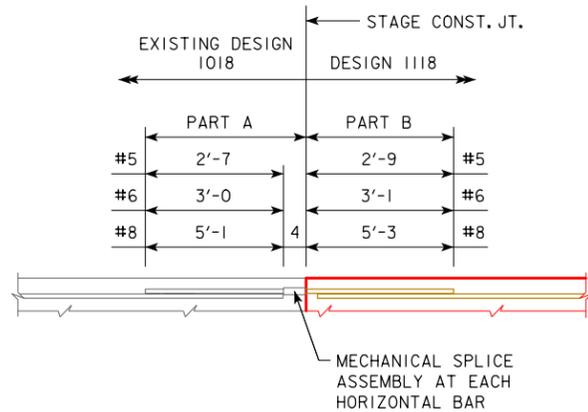
TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF DECK. BOTTOM TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF DECK. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR DECK BOLSTERS SPACED 4'-0" APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND DECK BOLSTERS.

COST OF BEARING MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

PAYMENT FOR REINFORCING BARS SHALL BE BASED ON SPLICES AS SHOWN, AND NO ALLOWANCE SHALL BE MADE FOR THE ADDITIONAL LENGTH OF BAR REQUIRED FOR THE USE OF ADDITIONAL SPLICES.

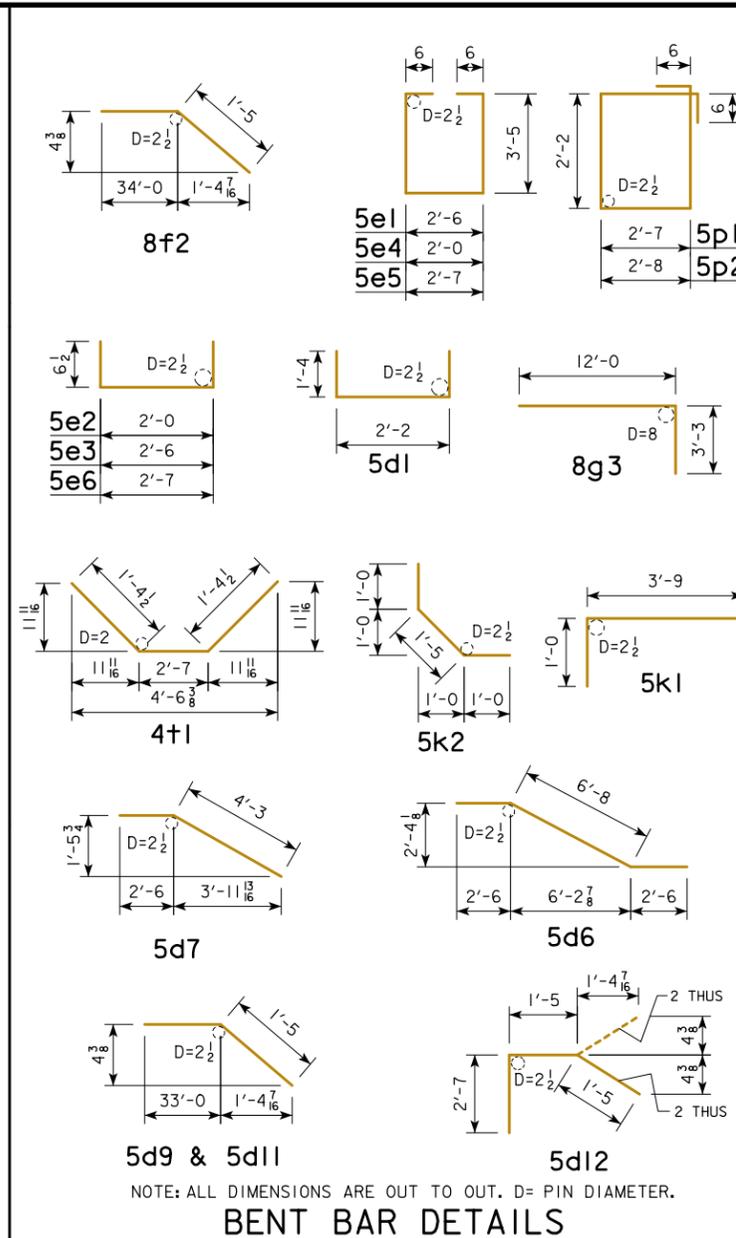
THE 8f1 BARS IN THE ABUTMENT FOOTING, THE 5d4, 5d5, 5d7, 5d8 AND 5d10 BARS IN THE PIER AND ABUTMENT DIAPHRAGMS, AND THE 6a2, 6a4, 6a6 AND 6a10 BARS IN THE DECK, SHALL BE SPLICED AT THE STAGE CONSTRUCTION JOINT USING MECHANICAL SPLICE ASSEMBLIES. MECHANICAL SPLICE ASSEMBLIES CONSIST OF MECHANICAL SPLICERS AND REINFORCING SPLICE BARS AS REQUIRED TO FACILITATE THE USE OF THE MECHANICAL SPLICER. THE MECHANICAL SPLICE ASSEMBLY USED SHALL MEET THE REQUIREMENTS OF MATERIALS IM 451 APPENDIX E. REINFORCING SPLICE BARS SHALL MATCH SIZE OF BAR TO BE SPLICED.

THE COST OF ALL SPLICE ASSEMBLIES IS TO BE INCLUDED IN DESIGN NO. 1018. A TOTAL OF 18 - #8 ABUTMENT FOOTING, 30 - #5 PIER AND ABUTMENT DIAPHRAGM, AND 113 - #6 DECK SPLICE ASSEMBLIES WILL BE REQUIRED.



### DETAIL OF MECHANICAL SPLICE ASSEMBLIES

MECHANICAL SPLICE ASSEMBLY PART A WAS INSTALLED IN DESIGN 1018.  
 MECHANICAL SPLICE ASSEMBLY PART B TO BE INSTALLED WITH DESIGN 1118.



### CONCRETE PLACEMENT QUANTITIES

LOCATION	QUANTITY
SECTION 1, DECK & ABUT. DIAPH.	74.4
SECTION 2, DECK	109.1
SECTION 3, DECK & ABUT. DIAPH.	106.0
SECTION 4, DECK & PIER DIAPH.	54.7
SECTION 5, DECK & PIER DIAPH.	54.7
SECTION 6, DECK CLOSURE POUR	17.1
<b>TOTAL (CU. YDS.)</b>	<b>416.0</b>

NOTE:  
 CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

△ SEE DESIGN SHEET 21 FOR 5a13 BENT BAR DETAILS

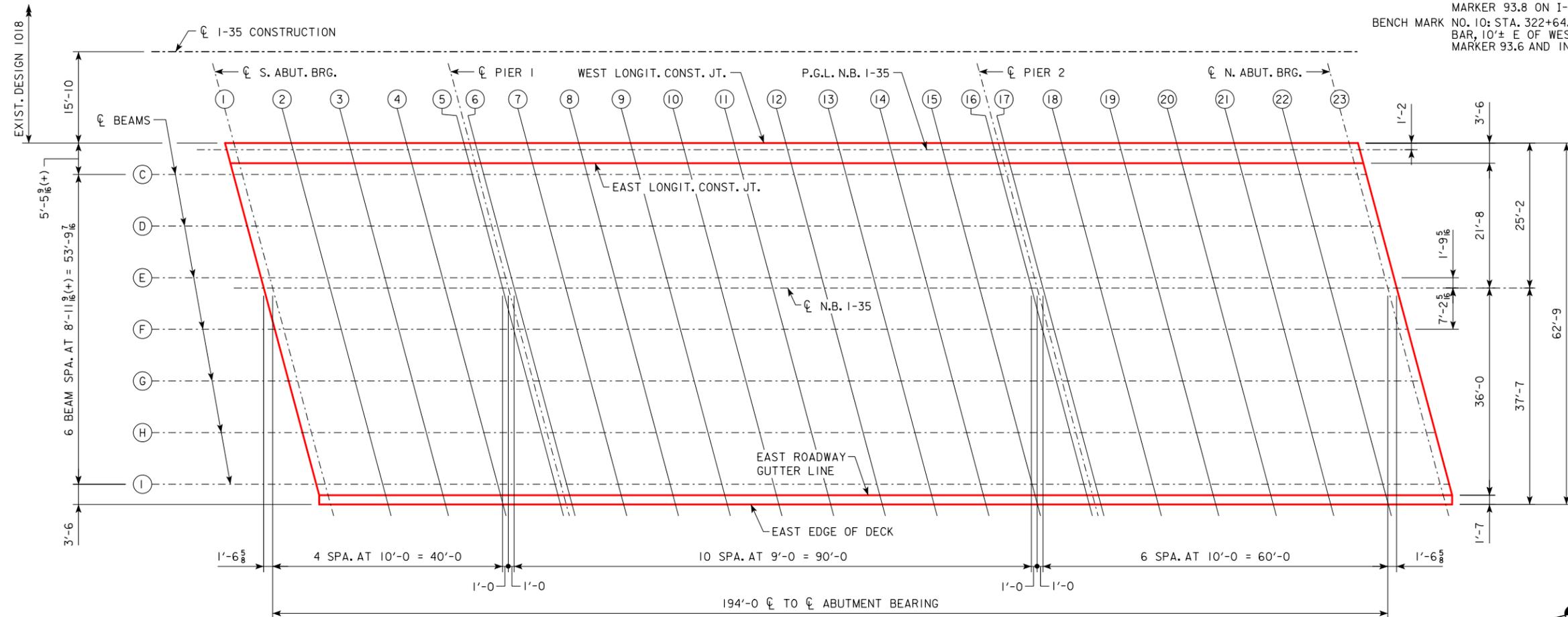
### REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	DECK TRANSV. TOP, EAST	U	225	36'-4"	12,279
6a2	DECK TRANSV. TOP, WEST	U	227	29'-5"	10,030
6a3	DECK TRANSV. BOTT., EAST	U	224	40'-10"	13,738
6a4	DECK TRANSV. BOTT., WEST	U	228	24'-11"	8,533
6a5	DECK TRANSV. TOP ENDS, SE	U	10	VARIABLES	304
6a6	DECK TRANSV. TOP ENDS, SW	U	8	VARIABLES	183
6a7	DECK TRANSV. TOP ENDS, NE	U	11	VARIABLES	295
6a8	DECK TRANSV. TOP ENDS, NW	U	8	VARIABLES	210
6a9	DECK TRANSV. BOTT. ENDS, SE	U	11	VARIABLES	356
6a10	DECK TRANSV. BOTT. ENDS, SW	U	7	VARIABLES	144
6a11	DECK TRANSV. BOTT. ENDS, NE	U	12	VARIABLES	379
6a12	DECK TRANSV. BOTT. ENDS, NW	U	6	VARIABLES	131
5a13	DECK TRANSV. HAUNCH, BEAM C	U	62	6'-5"	415
5b1	DECK LONGIT. TOP & BOTT.	U	768	35'-0"	28,036
8b2	DECK LONGIT. TOP AT PIERS	U	282	22'-8"	17,067
6b3	DECK LONGIT. HAUNCH, BEAM C	U	6	30'-0"	270
5d1	PIER DIAPH. ENDS	U	4	4'-10"	20
5d2	PIER & ABUT. DIAPH LONGIT.	U	72	8'-1"	607
5d3	PIER & ABUT. DIAPH LONGIT.	U	36	6'-1"	228
5d4	PIER & ABUT. DIAPH LONGIT.	U	12	5'-0"	63
5d5	PIER & ABUT. DIAPH LONGIT.	U	6	3'-10"	24
5d6	PIER DIAPH. LONGIT.	U	12	11'-8"	146
5d7	PIER DIAPH. LONGIT. ENDS	U	2	6'-9"	14
5d8	ABUT. DIAPH LONGIT. B.F.	U	6	33'-0"	207
5d9	ABUT. DIAPH LONGIT. B.F.	U	6	34'-5"	215
5d10	PAVING NOTCH LONGIT.	U	4	33'-0"	138
5d11	PAVING NOTCH LONGIT.	U	4	34'-5"	144
5d12	ABUT. DIAPH. ENDS	U	4	5'-5"	23
5e1	PIER DIAPH. HOOPS	U	78	10'-4"	841
5e2	PIER DIAPH. TIES ENDS	U	2	3'-1"	6
5e3	PIER DIAPH. TIES	U	78	3'-7"	292
5e4	PIER DIAPH. HOOPS ENDS	U	2	9'-10"	21
5e5	PIER DIAPH. HOOPS	U	2	10'-5"	22
5e6	PIER DIAPH. TIES	U	2	3'-8"	8
8f1	ABUT. FOOTING LONGIT. BOTH F.	U	18	34'-0"	1634
8f2	ABUT. FOOTING LONGIT. BOTH F.	U	18	35'-5"	1702
8g1	ABUT. VERT. BOTH F.	U	203	6'-10"	3704
8g3	ABUT. DIAPH. VERT. B.F.	U	110	15'-3"	4479
6j1	TOP OF DECK TRANSV. (AT RAIL)	U	236	6'-3"	2215
5k1	PAVING NOTCH	U	110	4'-9"	545
5k2	PAVING NOTCH	U	110	3'-5"	392
5p1	ABUT. HOOPS	U	188	10'-6"	2059
5p2	ABUT. HOOPS AT ENDS	U	8	10'-8"	89
4+1	UNDER BEAMS AT ABUTMENTS	U	14	5'-4"	50
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					112,258
#2	PILE SPIRAL	U	20	38'-6"	128
	SPIRAL SPACERS, L 1/8 x 7/8 x 1/8 x 0.70	U	60	1'-10"	77
REINFORCING STEEL - TOTAL (LBS.)					205

NON-COATED

DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0" x 75'-4"  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**DECK, ABUT. & DIAPH. QUANTITIES**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 23 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.



TOP OF DECK ELEVATION LOCATIONS

TOP OF DECK ELEVATIONS

LOCATION	CL S. ABUT. BEARING				CL PIER 1 BEARINGS						CL PIER 2 BEARINGS						CL N. ABUT. BEARING						
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23
WEST LONGIT. CONST. JT.	906.18	906.24	906.30	906.36	906.41	906.43	906.48	906.53	906.58	906.63	906.68	906.74	906.79	906.84	906.89	906.94	906.95	907.01	907.07	907.13	907.18	907.24	907.30
EAST LONGIT. CONST. JT.	906.28	906.34	906.40	906.45	906.51	906.52	906.58	906.63	906.68	906.73	906.78	906.83	906.89	906.94	906.99	907.04	907.05	907.11	907.17	907.22	907.28	907.34	907.40
BEAM LINE C	906.33	906.39	906.45	906.51	906.56	906.58	906.63	906.68	906.73	906.78	906.83	906.89	906.94	906.99	907.04	907.09	907.10	907.16	907.22	907.28	907.33	907.39	907.45
BEAM LINE D	906.57	906.62	906.68	906.74	906.80	906.81	906.86	906.91	906.96	907.01	907.07	907.12	907.17	907.22	907.27	907.32	907.34	907.39	907.45	907.51	907.57	907.62	907.68
BEAM LINE E	906.75	906.81	906.87	906.93	906.98	907.00	907.05	907.10	907.15	907.20	907.25	907.31	907.36	907.41	907.46	907.51	907.52	907.58	907.64	907.70	907.75	907.81	907.87
CL N.B. I-35	906.77	906.83	906.88	906.94	907.00	907.01	907.06	907.11	907.16	907.22	907.27	907.32	907.37	907.42	907.47	907.53	907.54	907.59	907.65	907.71	907.77	907.82	907.88
BEAM LINE F	906.66	906.72	906.78	906.84	906.89	906.91	906.96	907.01	907.06	907.11	907.16	907.22	907.27	907.32	907.37	907.42	907.43	907.49	907.55	907.61	907.66	907.72	907.78
BEAM LINE G	906.48	906.54	906.59	906.65	906.71	906.72	906.77	906.82	906.87	906.93	906.98	907.03	907.08	907.13	907.18	907.24	907.25	907.31	907.36	907.42	907.48	907.53	907.60
BEAM LINE H	906.26	906.32	906.38	906.43	906.49	906.50	906.56	906.61	906.66	906.71	906.76	906.81	906.87	906.92	906.97	907.02	907.03	907.09	907.15	907.20	907.26	907.32	907.38
BEAM LINE I	906.01	906.07	906.12	906.18	906.24	906.25	906.30	906.35	906.40	906.46	906.51	906.56	906.61	906.66	906.71	906.77	906.78	906.83	906.89	906.95	907.01	907.06	907.13
EAST GUTTER LINE	905.95	906.01	906.07	906.13	906.18	906.19	906.25	906.30	906.35	906.40	906.45	906.50	906.56	906.61	906.66	906.71	906.72	906.78	906.84	906.89	906.95	907.01	907.07

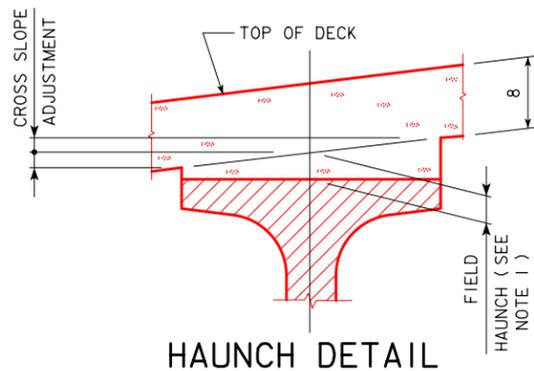
DESIGN FOR 15° SKEW (R.A.)  
**194'-0" x 15'-9" PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0" x 75'-4"  
 41'-0" AND 61'-0" END SPANS 92'-0" INTERIOR SPAN  
**TOP OF DECK ELEVATIONS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 24 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

BEAM LINE	☉ S. ABUT. BEARING				☉ PIER 1 BEARINGS										☉ PIER 2 BEARINGS						☉ N. ABUT. BEARING		
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23
C	905.67	905.73	905.79	905.85	905.90	905.91	906.01	906.11	906.20	906.27	906.33	906.37	906.40	906.42	906.42	906.43	906.44	906.52	906.59	906.65	906.71	906.75	906.78
D	905.90	905.97	906.03	906.08	906.13	906.14	906.26	906.38	906.48	906.56	906.62	906.66	906.68	906.69	906.68	906.66	906.67	906.76	906.84	906.90	906.95	906.99	907.01
E	906.09	906.15	906.22	906.27	906.32	906.33	906.45	906.57	906.67	906.75	906.81	906.85	906.87	906.88	906.86	906.85	906.86	906.95	907.03	907.09	907.14	907.18	907.20
F	906.00	906.07	906.13	906.18	906.23	906.24	906.36	906.48	906.58	906.66	906.72	906.76	906.78	906.79	906.77	906.76	906.77	906.86	906.94	907.00	907.05	907.09	907.12
G	905.81	905.88	905.94	905.99	906.04	906.05	906.17	906.29	906.39	906.47	906.54	906.58	906.60	906.60	906.59	906.57	906.58	906.67	906.75	906.82	906.86	906.90	906.93
H	905.60	905.66	905.72	905.78	905.83	905.84	905.96	906.07	906.17	906.26	906.32	906.36	906.38	906.38	906.37	906.35	906.37	906.45	906.53	906.60	906.65	906.68	906.71
I	905.34	905.41	905.47	905.52	905.57	905.58	905.70	905.82	905.92	906.00	906.06	906.11	906.13	906.13	906.12	906.10	906.11	906.20	906.28	906.34	906.39	906.43	906.46

MISCELLANEOUS DATA TABLE																								
	BEAM LINE	☉ S. ABUT. BEARING				☉ PIER 1 BEARINGS										☉ PIER 2 BEARINGS						☉ N. ABUT. BEARING		
		LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23
ANTICIPATED DEFLECTION DUE TO DECK (IN.)	C	0	1/16	1/8	1/16	0	0	5/8	1/8	9/16	13/16	15/16	13/16	19/16	1/8	5/8	0	0	1/4	7/16	9/16	7/16	1/4	0
	D, E, F, G, H & I	0	1/8	3/16	1/8	0	0	13/16	15/8	23/16	29/16	21/16	29/16	23/16	15/8	13/16	0	0	3/8	5/8	3/4	5/8	3/8	0
CROSS SLOPE ADJUSTMENTS (IN.)	C & G																7/16							
	D & F																5/16							
	E																1/4							
	H & I																1/2							
ALLOWABLE FIELD HAUNCH (IN. & FT.)	MAX.	ALL	3 1/2 (0.292)			3 (0.250)			3 1/2 (0.292)			2 1/2 (0.208)						3 1/2 (0.292)			3 (0.250)			3 1/2 (0.292)
	MIN.	C & G	1/2 (0.042)			0 (0.000)			1/2 (0.042)			-1/16 (-0.006)						1/2 (0.042)			0 (0.000)			1/2 (0.042)
		D & F	1/2 (0.042)			0 (0.000)			1/2 (0.042)			-3/16 (-0.013)						1/2 (0.042)			0 (0.000)			1/2 (0.042)
		E	1/2 (0.042)			0 (0.000)			1/2 (0.042)			-1/4 (-0.018)						1/2 (0.042)			0 (0.000)			1/2 (0.042)
		H & I	1/2 (0.042)			0 (0.001)			1/2 (0.042)			0 (0.001)						1/2 (0.042)			0 (0.001)			1/2 (0.042)

**NOTE:**  
 HAUNCH LOCATIONS ARE AT THE SAME LOCATION AS THE ENCIRCLED LETTERS AND NUMBERS SHOWN ON DECK ELEVATIONS SHEET.

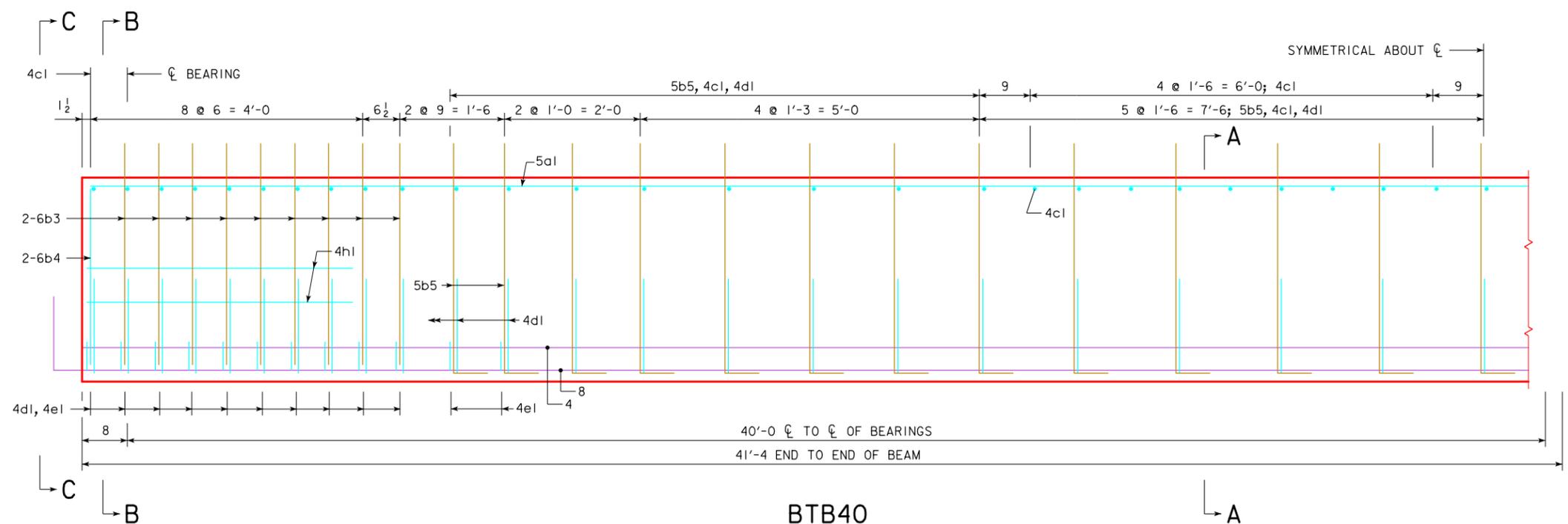


**NOTE:**  
 BRIDGE SEAT ELEVATIONS ARE SET BASED ON THEORETICAL CAMBER AND BEAM DEFLECTIONS. THESE BRIDGE SEATS WILL PROVIDE A THEORETICAL BEAM HAUNCH WITHIN DESIGN PARAMETERS. FIELD HAUNCHES ARE DETERMINED USING SURVEYED TOP OF BEAM ELEVATIONS AND "BEAM LINE HAUNCH ELEVATION" DATA. ALLOWABLE MAXIMUM AND MINIMUM "FIELD HAUNCH" VALUES ARE GIVEN IN INCHES AND DECIMALS OF FEET IN THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE.

**NOTE 1:**  
 TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACINGS SHOWN ON THE "TOP OF DECK ELEVATIONS LAYOUT". SUBTRACT THE SURVEYED BEAM SHOT FROM THE "BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE "FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES ADJUSTMENTS FOR DECK THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS SHOWN IN INCHES AND DECIMALS OF FEET IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

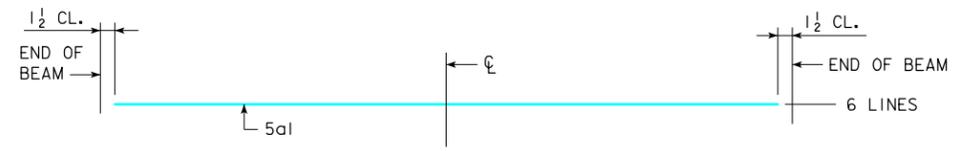
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**DECK HAUNCH DATA DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 25 OF 36 FILE NO. 30451 DESIGN NO. 1118



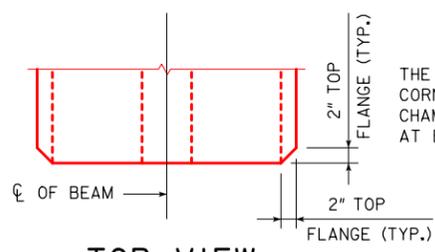


BTB40

NOTE: THIS BEAM USES MODIFIED STIRRUP EXTENSIONS.

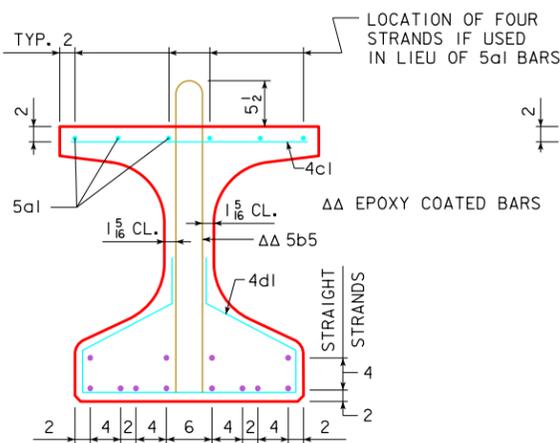


TOP FLANGE LONGITUDINAL BAR LAYOUT

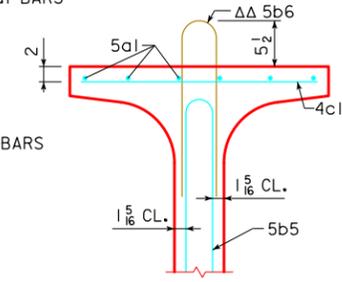


TOP VIEW

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

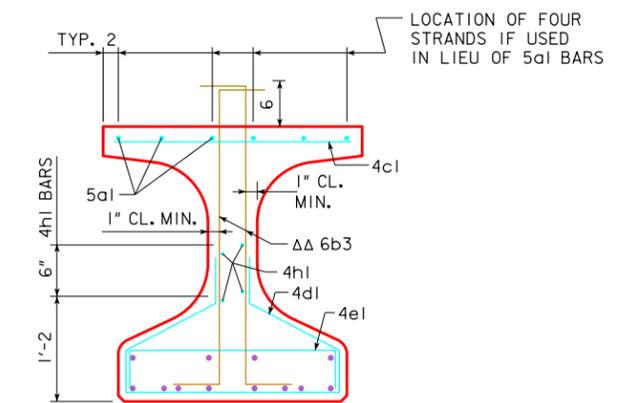


SECTION A-A

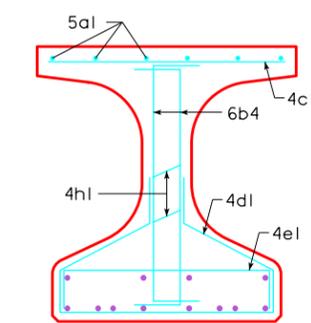


SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON DESIGN SHEET 26.

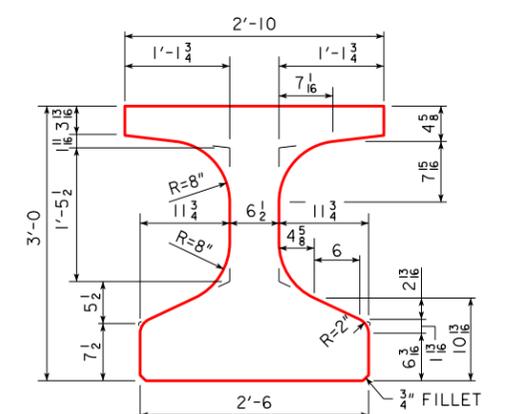


SECTION B-B



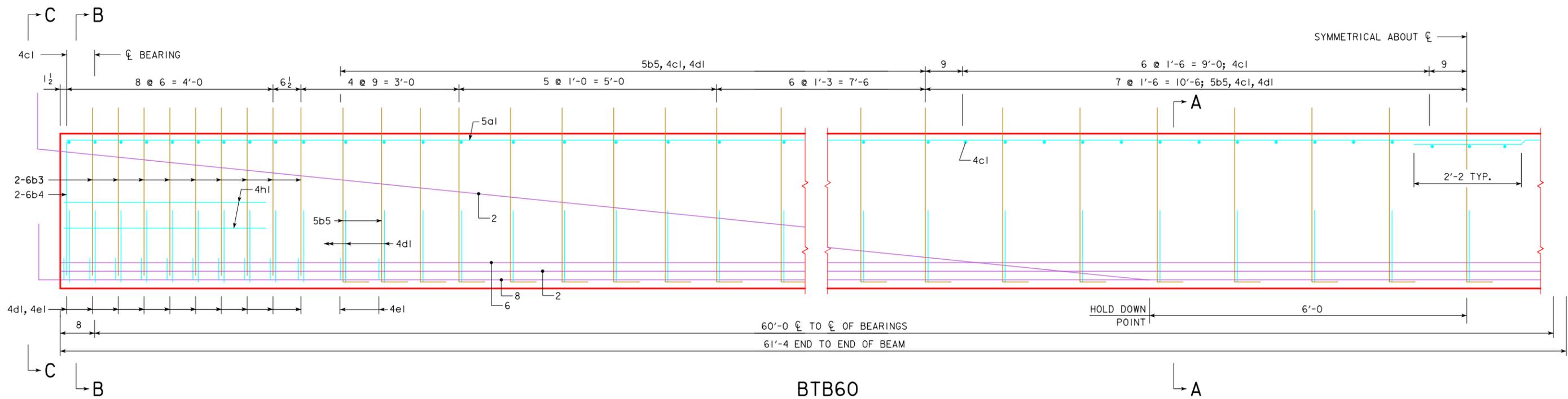
SECTION C-C

BEAM SECTION PROPERTIES  
 AREA = 631.7 in<sup>2</sup>  
 $\bar{y}_b = 17.14$  in.  
 I = 99,980 in<sup>4</sup>

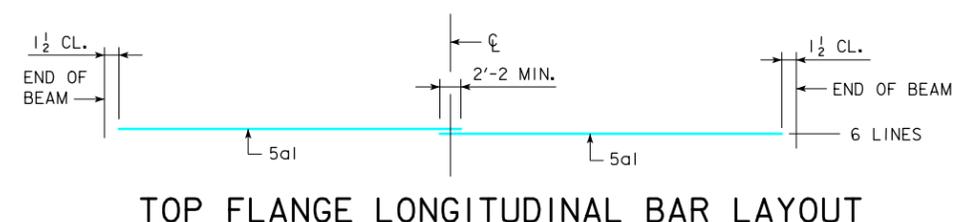


BTB BEAM CROSS SECTION

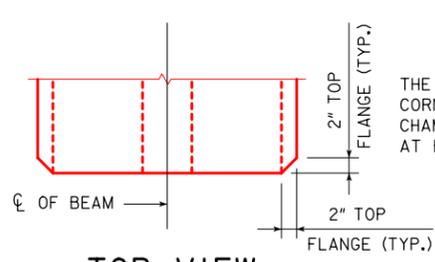
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**BTB40 BEAM DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
 POLK COUNTY  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 27 OF 36 FILE NO. 30451 DESIGN NO. 1118



NOTE: THIS BEAM USES MODIFIED STIRRUP EXTENSIONS.

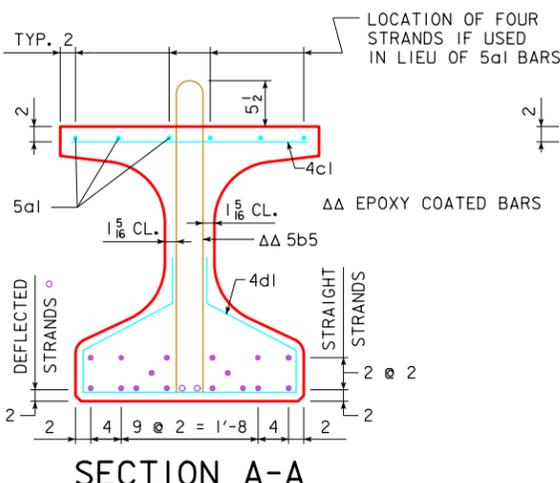


TOP FLANGE LONGITUDINAL BAR LAYOUT

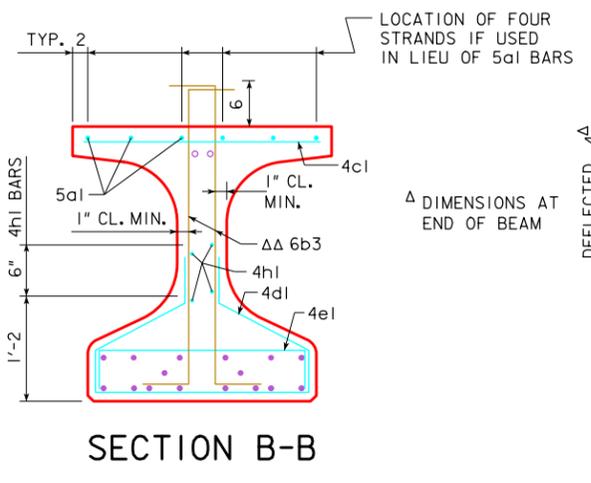


TOP VIEW

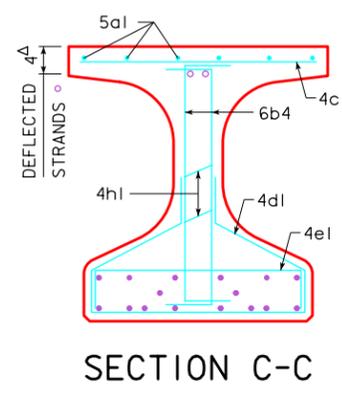
THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.



SECTION A-A (ALTERNATE)  
SEE ALTERNATE BAR NOTE ON DESIGN SHEET 26.

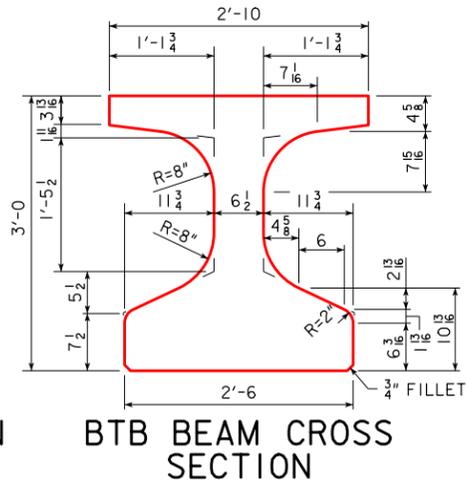


SECTION B-B



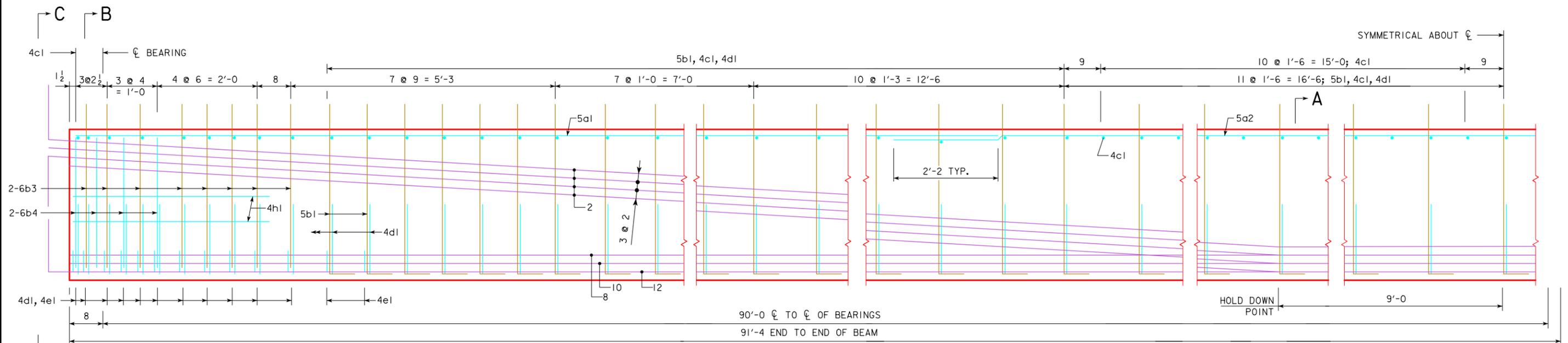
SECTION C-C

AREA = 631.7 in<sup>2</sup>  
y<sub>b</sub> = 17.14 in.  
I = 99,980 in<sup>4</sup>



BTB BEAM CROSS SECTION

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRESTRESSED CONCRETE BEAM BRIDGE**  
WIDENING TO 194'-0 x 75'-4  
41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**BTB60 BEAM DETAILS**  
STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
POLK COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 28 OF 36 FILE NO. 30451 DESIGN NO. 1118

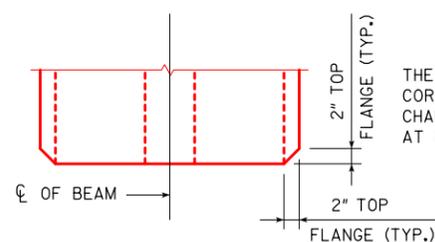


**BTB90**

NOTE: THIS BEAM USES MODIFIED STIRRUP EXTENSIONS.

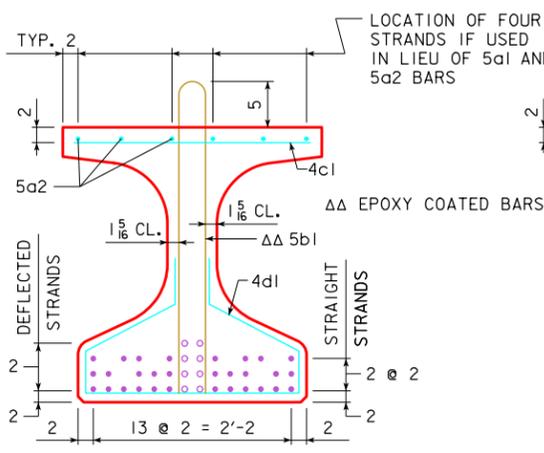


**TOP FLANGE LONGITUDINAL BAR LAYOUT**

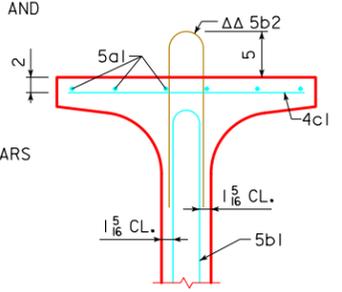


**TOP VIEW**

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2\"/>

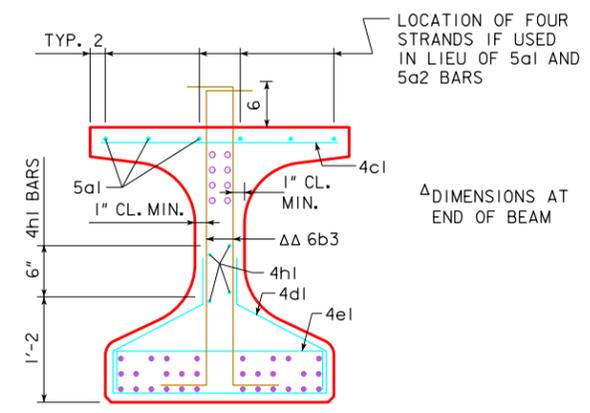


**SECTION A-A**

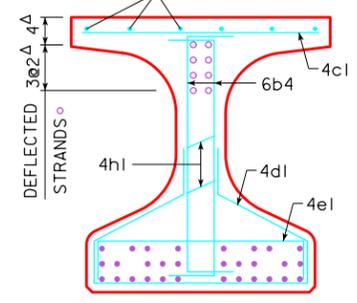


**SECTION A-A (ALTERNATE)**

SEE ALTERNATE BAR NOTE ON DESIGN SHEET 26.



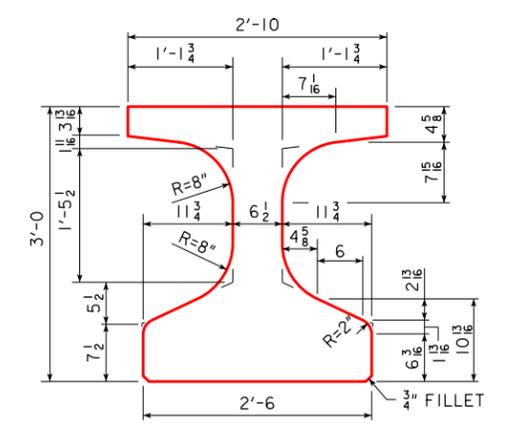
**SECTION B-B**



**SECTION C-C**

AREA = 631.7 in<sup>2</sup>  
 $\bar{y}_b = 17.14$  in.  
 $I = 99,980$  in<sup>4</sup>

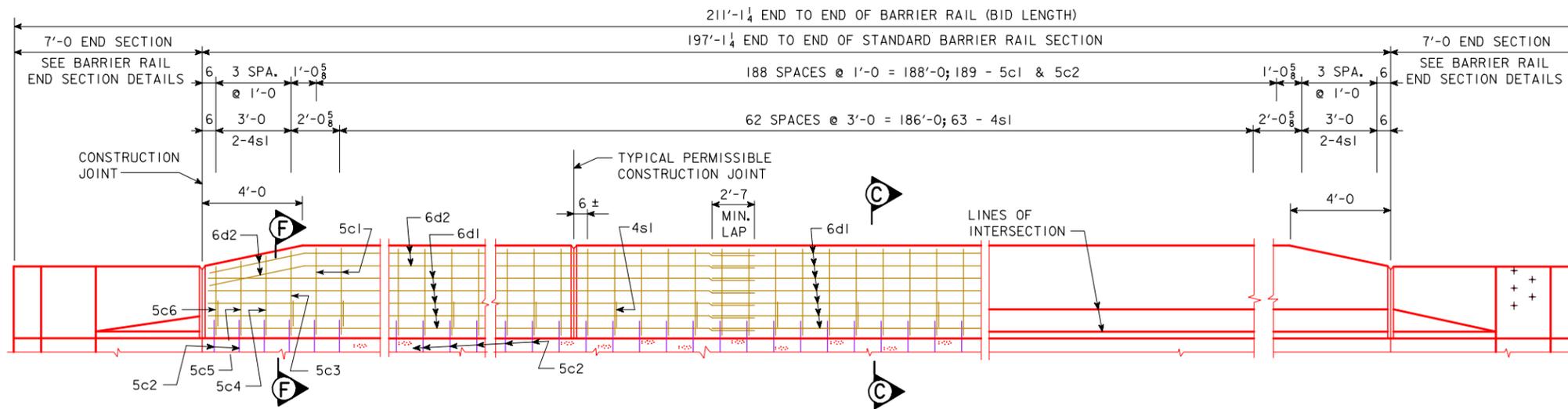
**BEAM SECTION PROPERTIES**



**BTB BEAM CROSS SECTION**

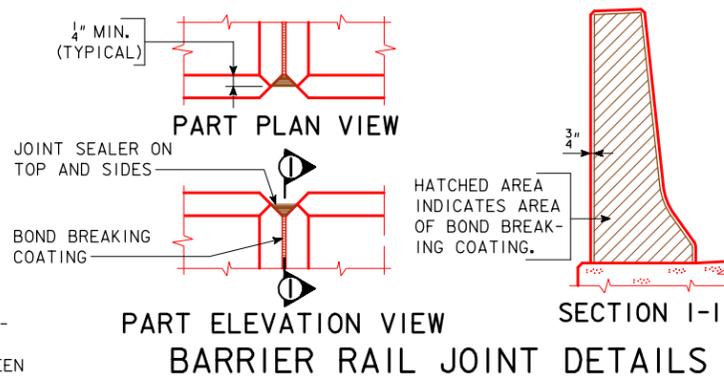
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**BTB90 BEAM DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 29 OF 36 FILE NO. 30451 DESIGN NO. 1118





ELEVATION OF BARRIER RAIL

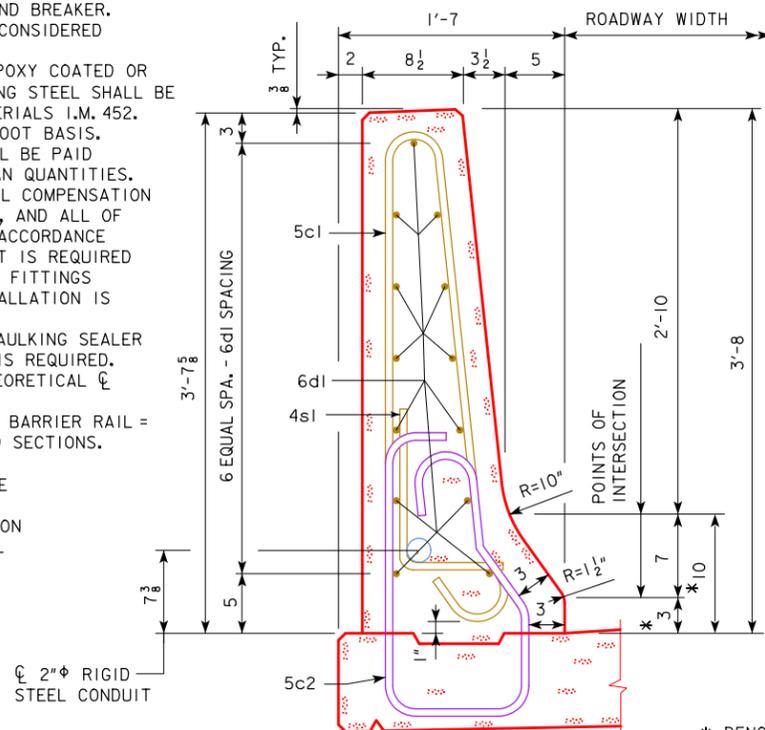
NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.



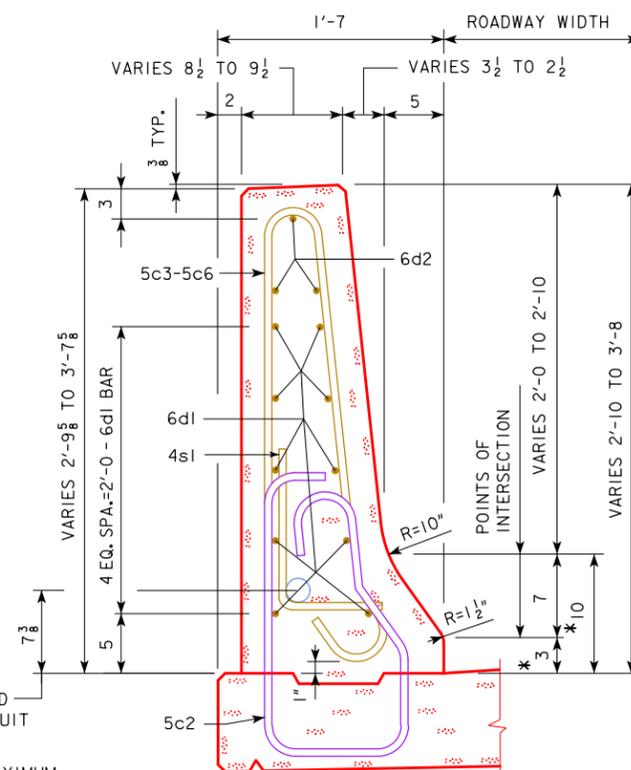
BARRIER RAIL JOINT DETAILS

**BARRIER RAIL NOTES:**

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.  
 THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER. COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.  
 ALL BARRIER RAIL REINFORCING STEEL IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M. 452.  
 THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR 3'-8 CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS. IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.  
 THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.  
 TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL  $\phi$  GRADE, EXCEPT AT THE SPECIAL SECTIONS.  
 CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 3.46 SQUARE FEET EXCEPT THE 4'-0 SLOPED ENDS AT THE END SECTIONS.  
 PROVIDE ADEQUATE SPACE BETWEEN THE GALVANIZED STEEL CONDUIT AND THE STAINLESS STEEL REINFORCING TO MEET THE REQUIREMENTS OF MATERIALS I.M. 452. THE GALVANIZED STEEL CONDUIT SHALL BE SECURELY TIED AT EVERY 3'-0 INTERSECTION WITH THE 4s1 BARS TO AVOID CONTACT WITH STAINLESS STEEL REINFORCING.



PART SECTION C-C



PART SECTION F-F

\* DENOTES THE MAXIMUM VALUE FOR THIS DIMENSION. THIS DIMENSION MAY VARY DUE TO CONSTRUCTION INACCURACIES.

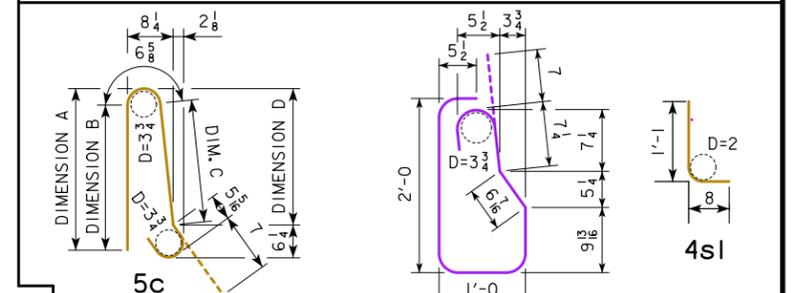
**EPOXY COATED REINF. STEEL - ONE RAIL**

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTIONS	5c1	RAIL, VERTICAL		189	7'-5	1462
	5c3	RAIL, VERTICAL, SLOPED ENDS		2	7'-3	15
	5c4	RAIL, VERTICAL, SLOPED ENDS		2	6'-10	14
	5c5	RAIL, VERTICAL, SLOPED ENDS		2	6'-5	13
	5c6	RAIL, VERTICAL, SLOPED ENDS		2	6'-0	13
	6d1	RAIL, LONGITUDINAL		72	35'-0	3785
6d2	RAIL, LONGITUDINAL, TOP SLOPED ENDS		6	35'-1	316	
	4s1	RAIL, VERTICAL		67	1'-9	78
EPOXY STEEL TOTAL WEIGHT (LBS.)						5696

**STAINLESS STEEL REINF. STEEL - ONE RAIL**

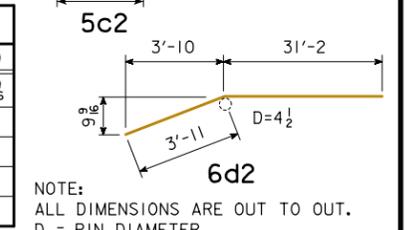
SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTIONS	5c2	RAIL, VERTICAL		197	6'-0	1233
STAINLESS STEEL TOTAL WEIGHT (LBS.)						1233

**BENT BAR DETAILS**



**5c BARS**

BAR	DIM. A	DIM. B	DIM. C	DIM. D
5c1	3'-3 13/16	3'-1 5/16	2'-8 1/2	2'-10 9/16
5c3	3'-2 9/16	3'-0	2'-7 1/4	2'-9 5/16
5c4	3'-0 1/16	2'-9 9/16	2'-4 3/4	2'-6 7/8
5c5	2'-9 9/16	2'-7 1/16	2'-2 1/4	2'-4 3/8
5c6	2'-7 1/16	2'-4 9/16	1'-11 7/8	2'-1 1/8



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

**CONCRETE PLACEMENT SUMMARY**

SECTION	TOTAL	
STANDARD SECTION 197'-1 1/4 @ 0.1281 CU. YD. PER FT.	25.2	
TOTAL (CU. YD.)		25.2

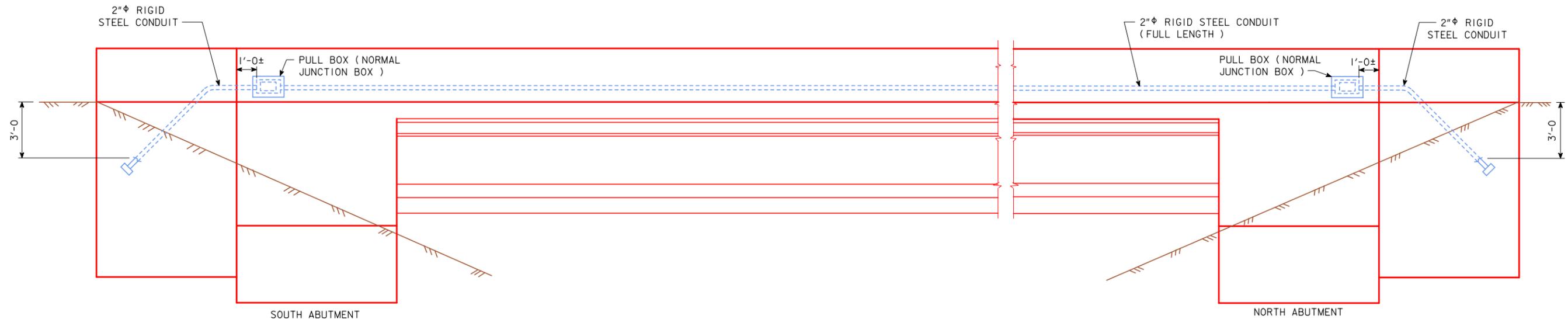
**CONCRETE BARRIER RAIL QUANTITIES**

ITEM	UNIT	QUANTITY
CONCRETE BARRIER RAILING, 3'-8	L.F.	211.1

Δ DEDUCT 0.044 CU. YD. FOR ONE SLOPED END.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE  
 WIDENING TO 194'-0 x 75'-4**  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**EAST BARRIER RAIL DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 31 OF 36 FILE NO. 30451 DESIGN NO. 1118





EXTERIOR ELEVATION - EAST BARRIER RAIL - LOOKING WEST

**CONDUIT NOTES:**

SEE LI-104 STANDARD ROAD PLAN FOR ADDITIONAL INFORMATION ON JUNCTION BOXES.

CONSTRUCTION SHALL CONFORM TO THE CURRENT IOWA D.O.T. STANDARD AND SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

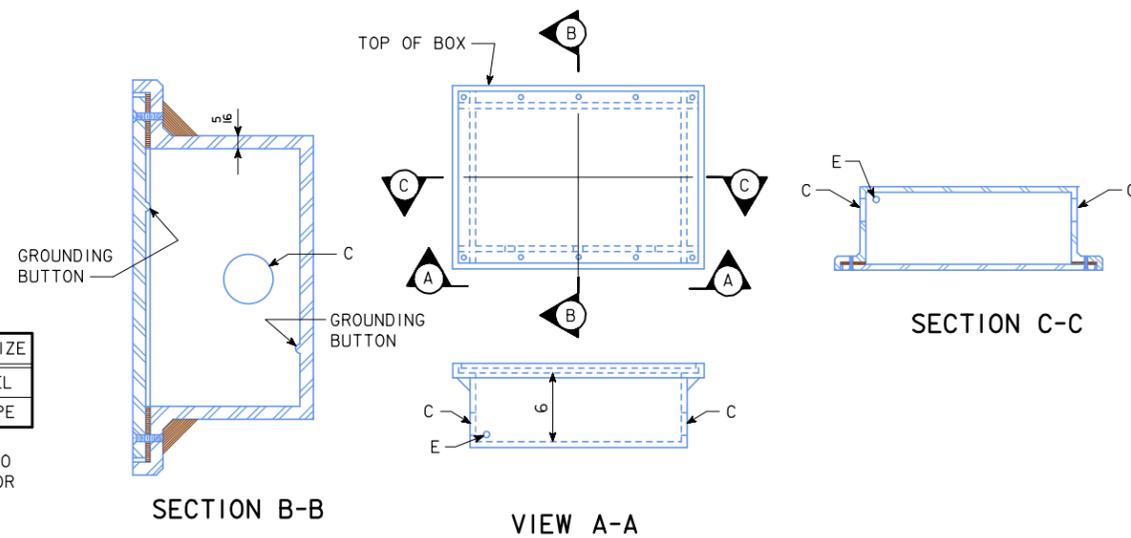
CONDUIT INSTALLATION SHALL BE IN ACCORDANCE WITH ARTICLE 2523.03, N, OF THE STANDARD SPECIFICATIONS.

ALL "C" ENTRANCE HOLES IN JUNCTION BOXES SHALL BE DRILLED AND TAPPED FOR THE SPECIFIED CONDUIT SIZE. ALL OTHER HOLES SHALL HAVE A CONCRETE - TIGHT SLIP FIT. CONDUIT ENDS SHALL NOT PROTRUDE INTO JUNCTION BOX MORE THAN 1/4". DRAIN PIPE END SHALL BE FLUSH WITH INSIDE SURFACE OF BOX. GROUNDING BUTTONS SHALL BE LOCATED APPROXIMATELY 3" FROM THE INSIDE SURFACE OF THE BOX WALL, AND NOT CLOSER THAN 3" TO THE EDGE OF ANY HOLE IN THE BOX FLOOR. HOLES FOR DRAIN PIPE SHALL BE PLACED IN THE LOW CORNER OF THE BOX, WITH A MINIMUM CLEARANCE OF 1" BETWEEN THE EDGE OF THE HOLE AND THE INSIDE SURFACE OF THE BOX WALL. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.

THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

BOSS FOR	HOLE	FOR CONDUIT SIZE
5 THREADS	C	2" $\phi$ RIGID STEEL
NONE	E	1/2" $\phi$ COPPER PIPE

NOTE:  
THE GROUNDING BUTTONS ARE TO BE BLIND DRILLED AND TAPPED FOR 3/8"  $\phi$  x 0'-0 3/4" BOLTS.

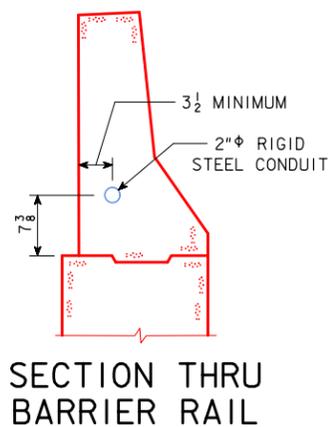


SECTION B-B

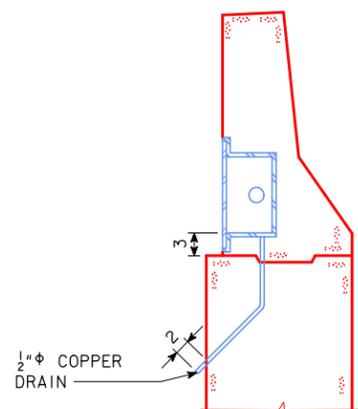
VIEW A-A

LI-104 JUNCTION BOX

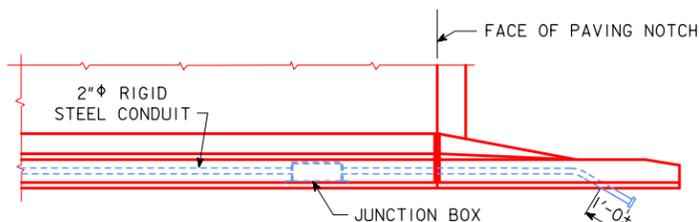
WATERTIGHT, CAST IRON - FLUSH MOUNT



SECTION THRU BARRIER RAIL



SECTION THRU JUNCTION BOX



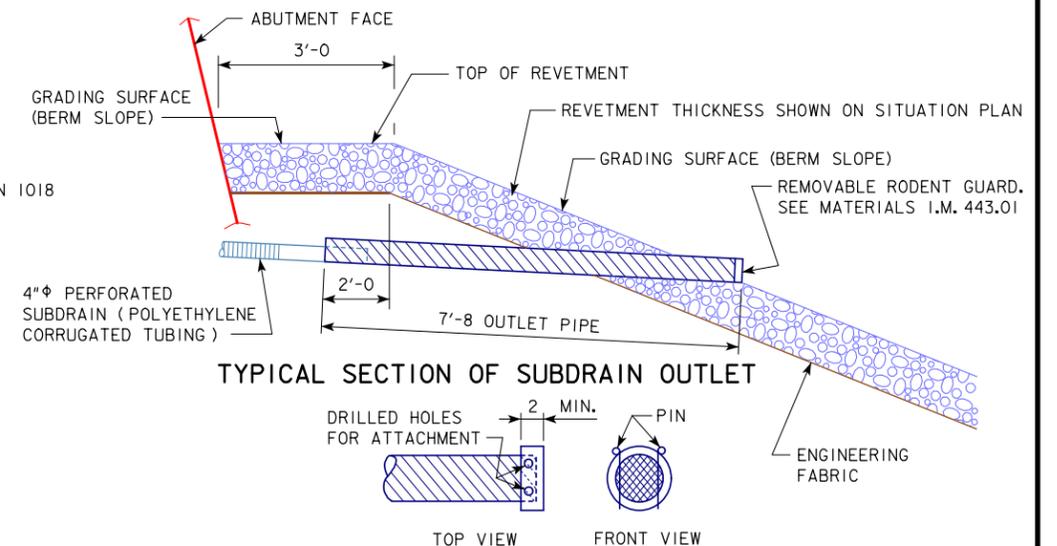
DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**CONDUIT DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 33 OF 36 FILE NO. 30451 DESIGN NO. 1118

BENCH MARK NO. 9: STA. 335+38.74 152.88' LT. SET 1"x36" SMOOTH BAR 10'± E OF WEST ROW LINE 250'± N OF MILE MARKER 93.8 ON I-35, ELEV 919.38.  
 BENCH MARK NO. 10: STA. 322+64.11 148.31' LT. SET 1"x36" SMOOTH BAR, 10'± E OF WEST ROW LINE 25'± S OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP, ELEV 913.93.

**SUBDRAIN NOTES :**

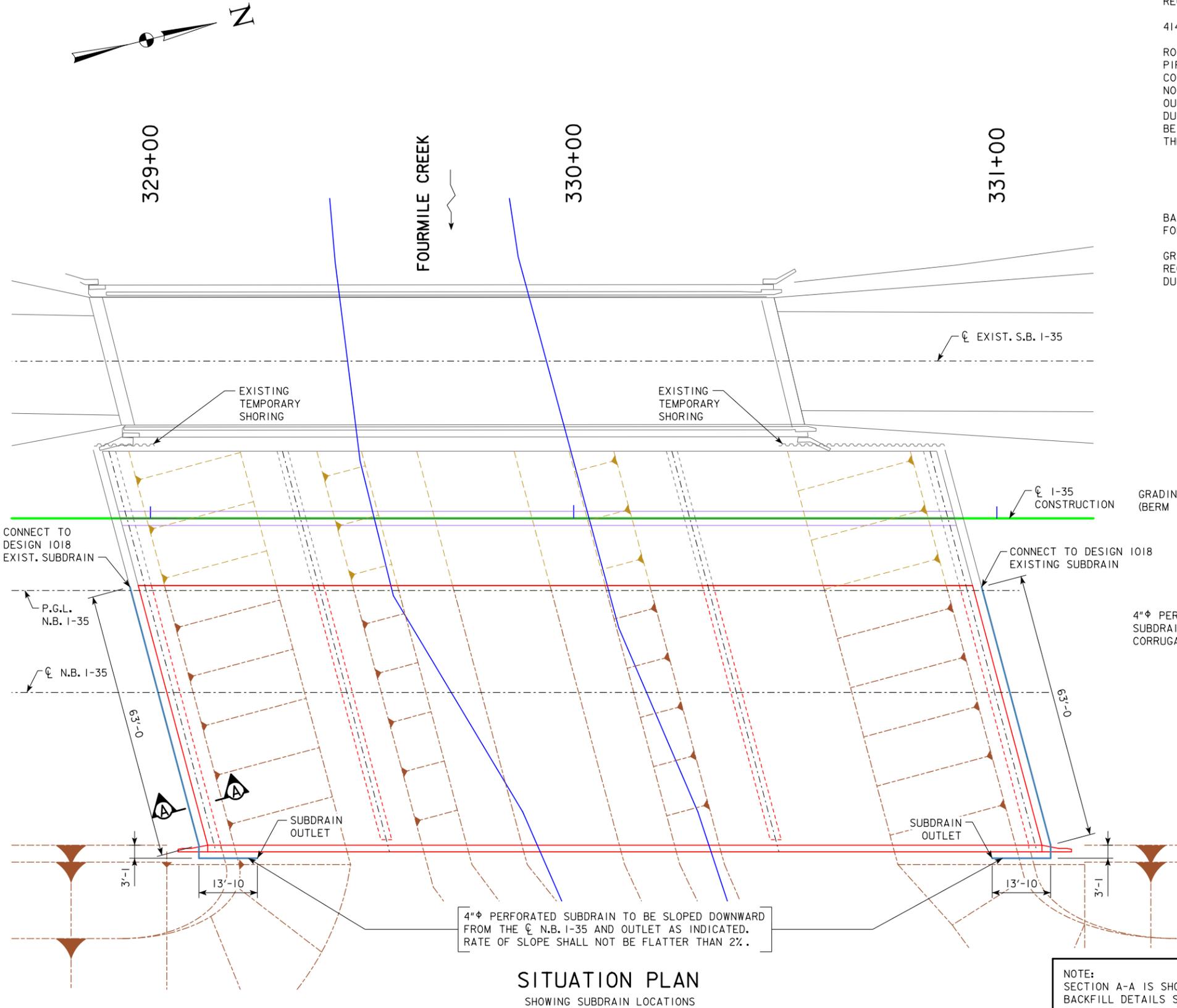
THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.  
 THE SUBDRAINS SHALL BE 4" IN DIAMETER AND SHALL BE IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS.  
 THE SUBDRAIN OUTLET SHALL CONSIST OF A LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET. THE LENGTH OF THE OUTLET PIPE SHALL BE DETERMINED BY THE REVETMENT AND ITS PLACEMENT LOCATION. THE CONTRACTOR IS TO INSURE THE OUTLET PIPE IS ADEQUATELY STRONG ENOUGH AND WILL NOT BE DAMAGED WHEN REVETMENT IS PLACED. A CHECK WILL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT THE SUBDRAIN IS NOT DAMAGED AND IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS. IF A METAL OUTLET PIPE IS USED, IT SHALL BE 6 INCHES IN DIAMETER AND COUPLED TO THE 4 INCH DIAMETER SUBDRAIN IN ONE OF THE TWO FOLLOWING WAYS.  
 1. USE AN INSIDE FIT REDUCER COUPLER (COUPLER MUST BE INSERTED A MINIMUM OF 1'-0 INTO THE METAL OUTLET PIPE).  
 2. INSERT 1'-0 OF THE 4"φ SUBDRAIN INTO THE 6"φ METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.  
 THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". 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.

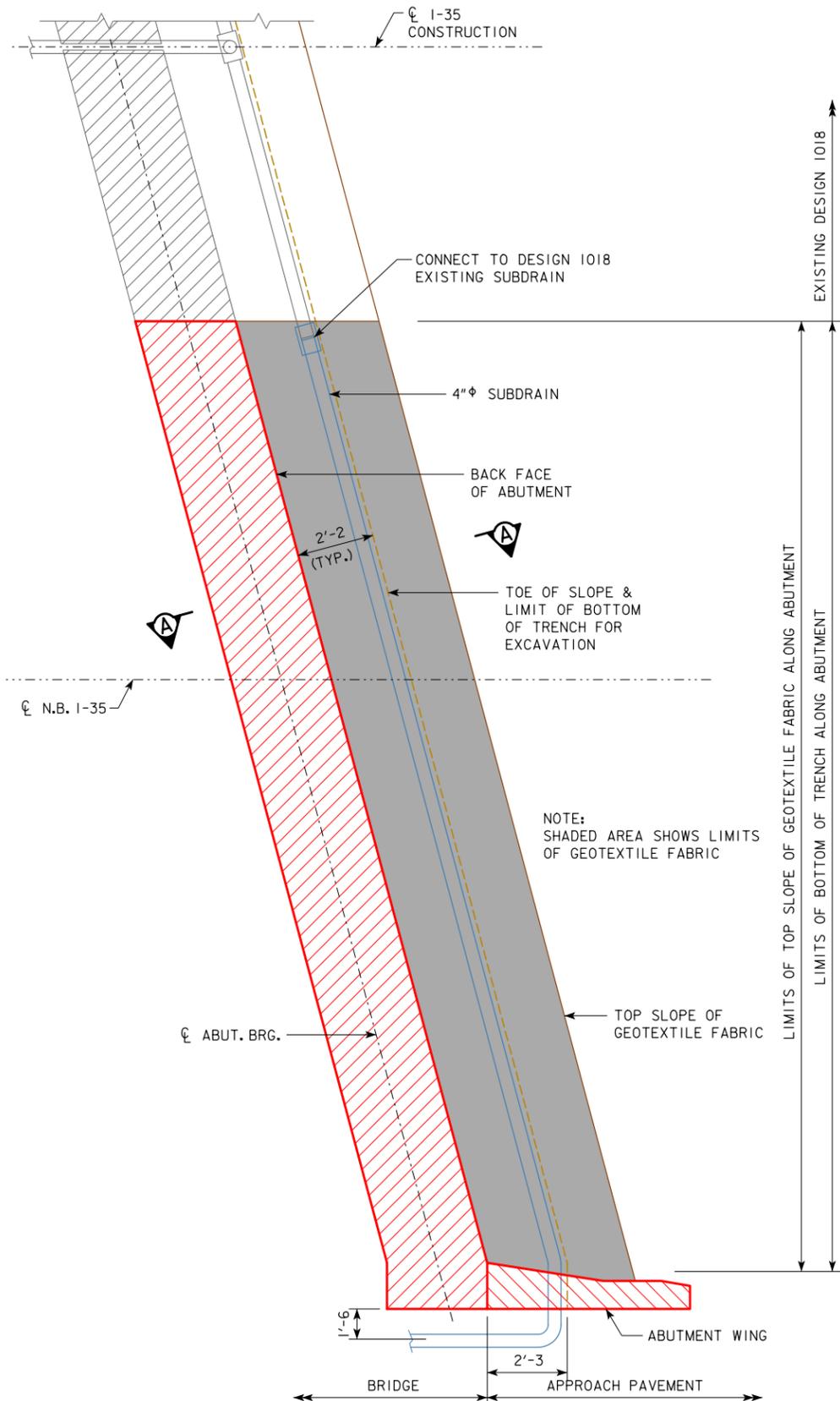
SUBDRAIN OUTLET ELEVATIONS	
LOCATION	ELEVATION
SOUTH ABUTMENT	898.06
NORTH ABUTMENT	899.18



**REMOVABLE RODENT GUARD DETAILS  
 REVETMENT STONE (EMBEDDED) OUTLET DETAILS**

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**SUBDRAIN DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 34 OF 36 FILE NO. 30451 DESIGN NO. 1118





### ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 5 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

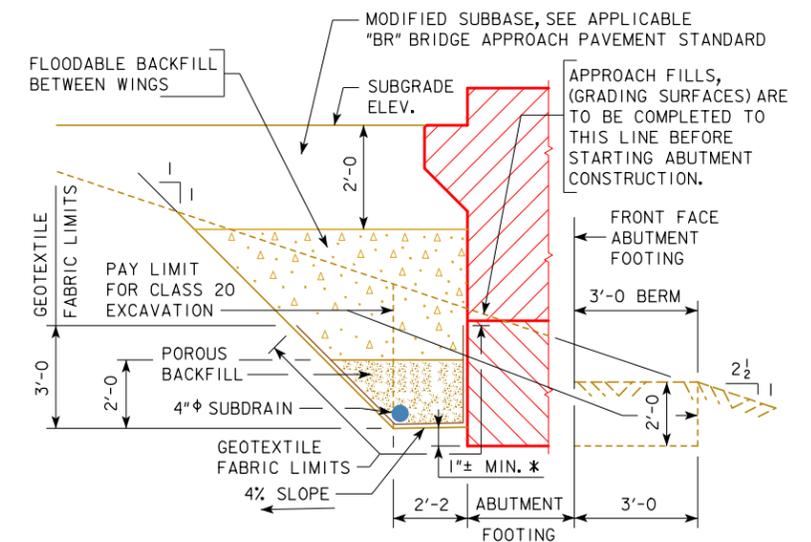
WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

### NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM  $\text{C}$  N.B. 1-35.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



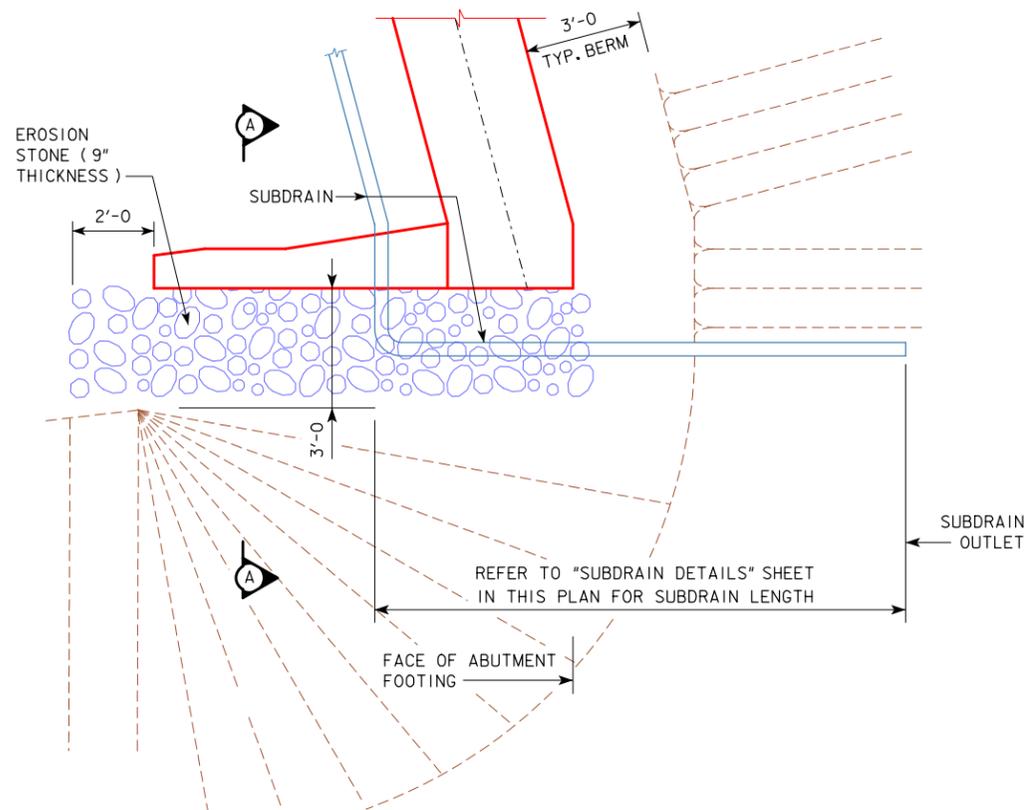
### SECTION A-A BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

\* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

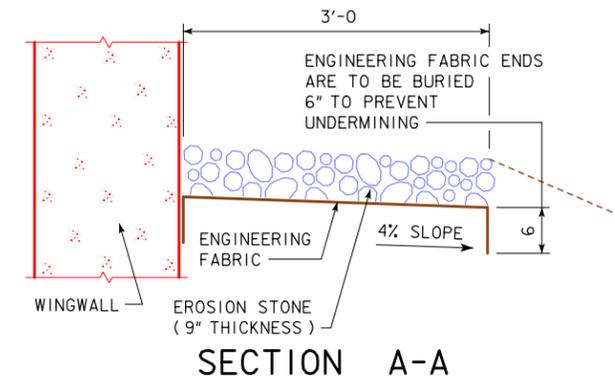
NOTE:  
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**ABUTMENT BACKFILL DETAILS**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 35 OF 36 FILE NO. 30451 DESIGN NO. 1118



TOP VIEW OF WING ARMORING

A CHECK SHALL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT IT IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS.



SECTION A-A

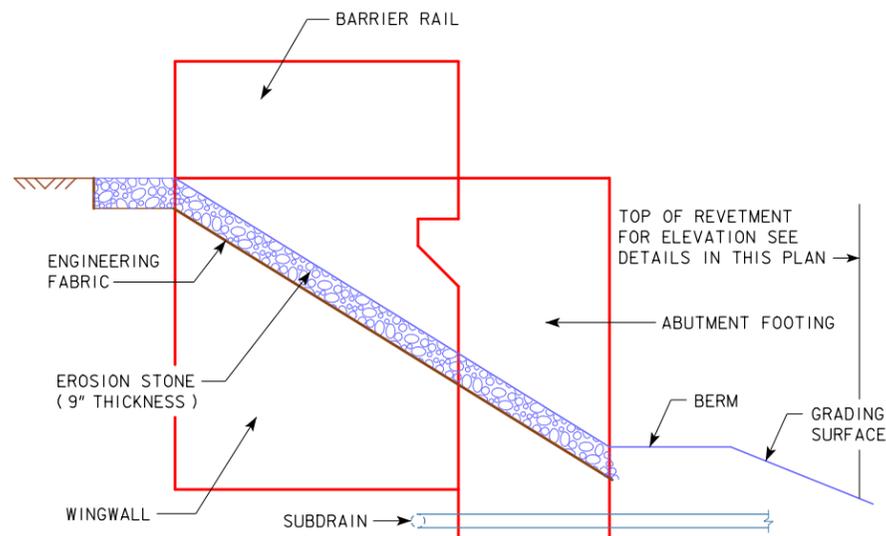
GENERAL NOTES:

EROSION STONE SHALL BE PLACED ALONG THE SIDES OF THE WINGS AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE EROSION STONE AT THESE LOCATIONS SHALL BE UNDERLAYERED WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

THE EROSION STONE SHALL BE IN ACCORDANCE WITH SECTION 4130, OF THE STANDARD SPECIFICATIONS. MATERIAL PASSING THE 3 INCH SCREEN BUT 100% RETAINED ON A 1 INCH SCREEN MAY BE USED AS CHOKE STONE.

THE EROSION STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM 9" DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, EROSION STONE, EXCAVATION, SHAPING, AND COMPACTION TO DIMENSIONS SHOWN IN THESE PLANS. BID ITEM SHALL BE "BRIDGE WING ARMORING - EROSION STONE".

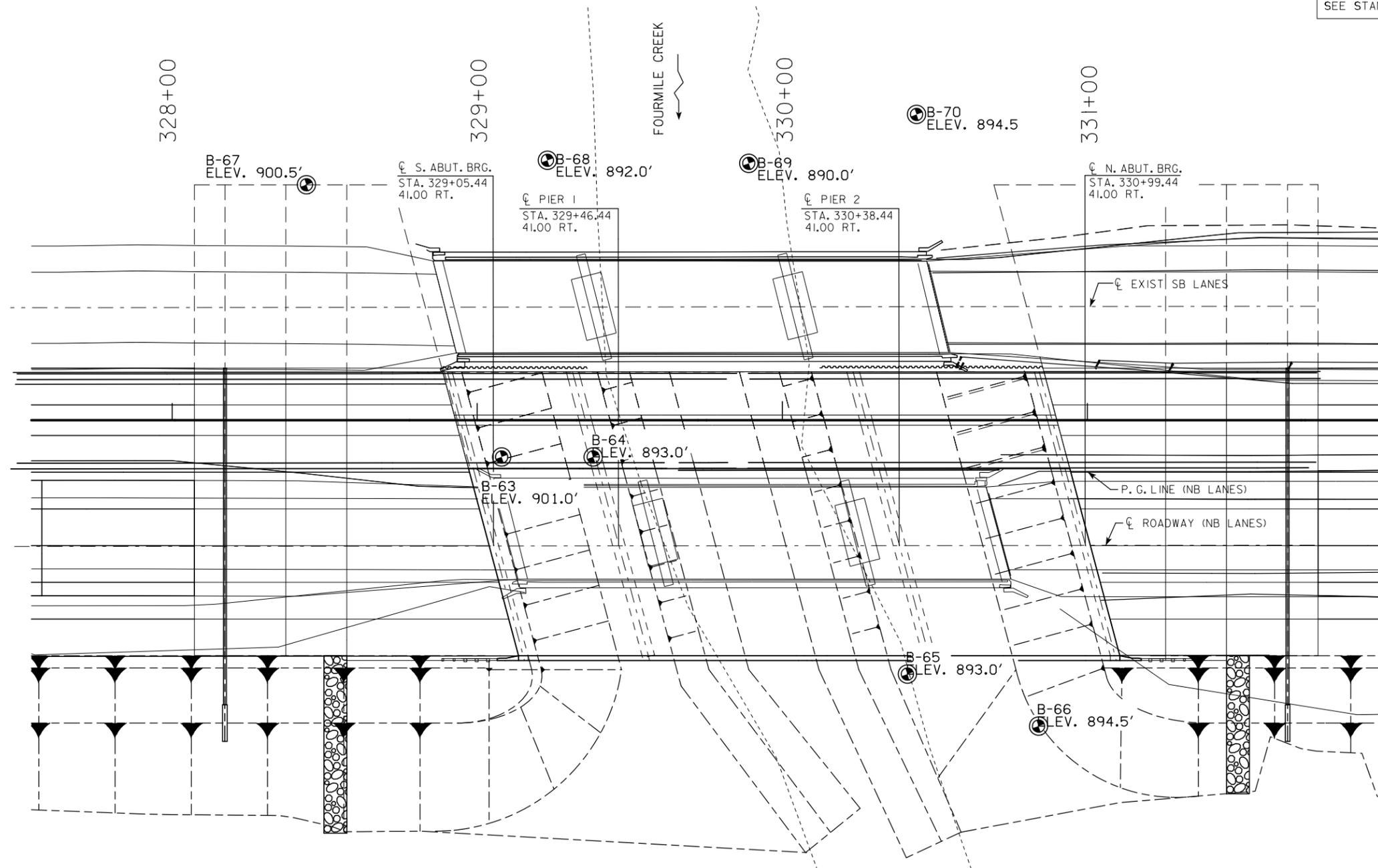


PROFILE VIEW OF WING ARMORING

DESIGN FOR 15° SKEW (R.A.)  
**194'-0 x 15'-9 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM BRIDGE**  
 WIDENING TO 194'-0 x 75'-4  
 41'-0 AND 61'-0 END SPANS 92'-0 INTERIOR SPAN  
**BRIDGE WING ARMORING**  
 STATION 330+02.44 41.00' RT. (STAGE B) MAY 2017  
**POLK COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 36 OF 36 FILE NO. 30451 DESIGN NO. 1118

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

NOTE: SOILS MAY VARY BETWEEN BORINGS. SEE STANDARD SPECIFICATION 1104.01



**GEOTECHNICAL DESIGN**



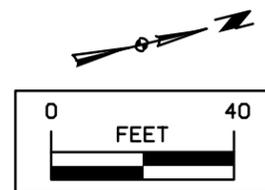
I hereby certify that this engineering document was prepared under my supervision and that engineering decisions with regard to the design were made by me or by other duly licensed Professional Engineers under the laws of the State of Iowa.

*Matthew D. Cushman* 04/12/2017  
Signature Date

MATTHEW D. CUSHMAN  
Printed or Typed Name

My license renewal date is December 31, 2018

Pages or sheets covered by this seal: SPS.1 - SPS.3

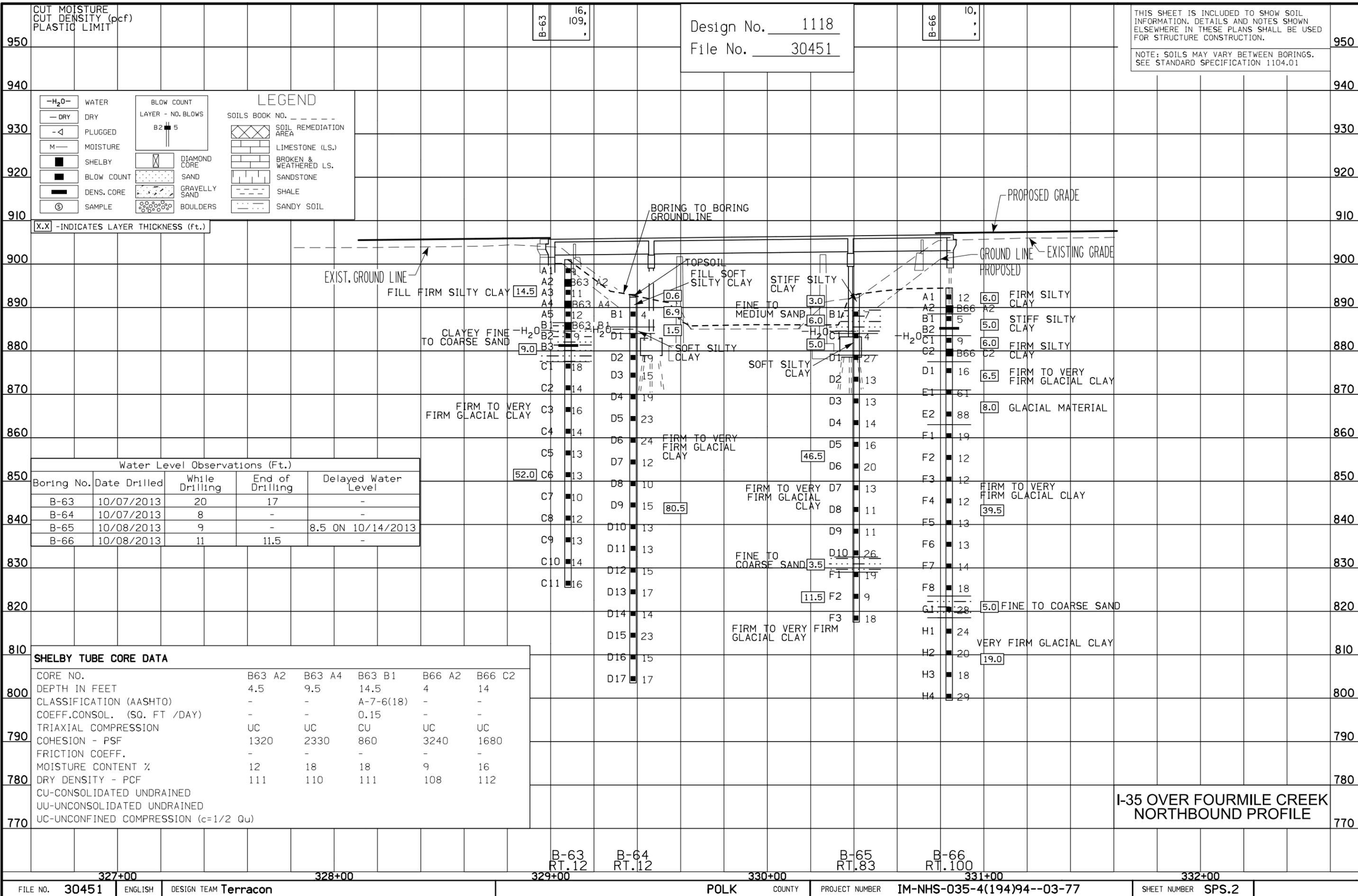


**LOCATION**

N.B. I-35 OVER FOURMILE CREEK  
T-80 N R-23 W  
SECTION 7  
DOUGLAS TOWNSHIP  
POLK COUNTY  
N.B. FHWA NO. 41811  
N.B. BRIDGE MAINT. NO. 7793.6R035  
LATITUDE: 41.747279°  
LONGITUDE: -93.575024°

DESIGN FOR 15° SKEW (R.A.)  
**194'-0x15'-9 PRETENSIONED  
PRESTRESSED CONCRETE BEAM BRIDGE  
WIDENING TO 194'-0 x 75'-4** BTB BEAMS

SPANS (41'-0, 92'-0, 61'-0)  
I-35 OVER FOURMILE CREEK  
**SOIL PROFILE SHEET**  
STATION 330+02.44 41.00' RT. (STAGE B)  
**CITY OF ANKENY - POLK COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
FILE NO. 30451 DESIGN NO. 1118



Design No. 1118  
File No. 30451

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.  
NOTE: SOILS MAY VARY BETWEEN BORINGS. SEE STANDARD SPECIFICATION 1104.01

**LEGEND**

SOILS BOOK NO. \_\_\_\_\_

SOIL REMEDIATION AREA

LIMESTONE (LS.)

BROKEN & WEATHERED LS.

SANDSTONE

SHALE

SANDY SOIL

WATER

DRY

PLUGGED

MOISTURE

SHELBY

BLOW COUNT

DENS. CORE

SAMPLE

BLOW COUNT LAYER - NO. BLOWS

DIAMOND CORE

SAND

GRAVELLY SAND

BOULDERS

[X.X] - INDICATES LAYER THICKNESS (ft.)

**Water Level Observations (Ft.)**

Boring No.	Date Drilled	While Drilling	End of Drilling	Delayed Water Level
B-63	10/07/2013	20	17	-
B-64	10/07/2013	8	-	-
B-65	10/08/2013	9	-	8.5 ON 10/14/2013
B-66	10/08/2013	11	11.5	-

**SHELBY TUBE CORE DATA**

CORE NO.	B63 A2	B63 A4	B63 B1	B66 A2	B66 C2
DEPTH IN FEET	4.5	9.5	14.5	4	14
CLASSIFICATION (AASHTO)	-	-	A-7-6(18)	-	-
COEFF. CONSOL. (SQ. FT /DAY)	-	-	0.15	-	-
TRIAXIAL COMPRESSION	UC	UC	CU	UC	UC
COHESION - PSF	1320	2330	860	3240	1680
FRICTION COEFF.	-	-	-	-	-
MOISTURE CONTENT %	12	18	18	9	16
DRY DENSITY - PCF	111	110	111	108	112

I-35 OVER FOURMILE CREEK  
NORTHBOUND PROFILE

Design No. 1118  
File No. 30451

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.  
NOTE: SOILS MAY VARY BETWEEN BORINGS. SEE STANDARD SPECIFICATION 1104.01

**LEGEND**

SOILS BOOK NO. \_\_\_\_\_

SOIL REMEDIATION AREA

WATER: -H<sub>2</sub>O-  
DRY: -DRY-  
PLUGGED: -D-  
MOISTURE: M-  
SHELBY: [Symbol]  
BLOW COUNT: [Symbol]  
DENS. CORE: [Symbol]  
SAMPLE: [Symbol]

BLOW COUNT LAYER - NO. BLOWS  
B2 5

DIAMOND CORE: [Symbol]

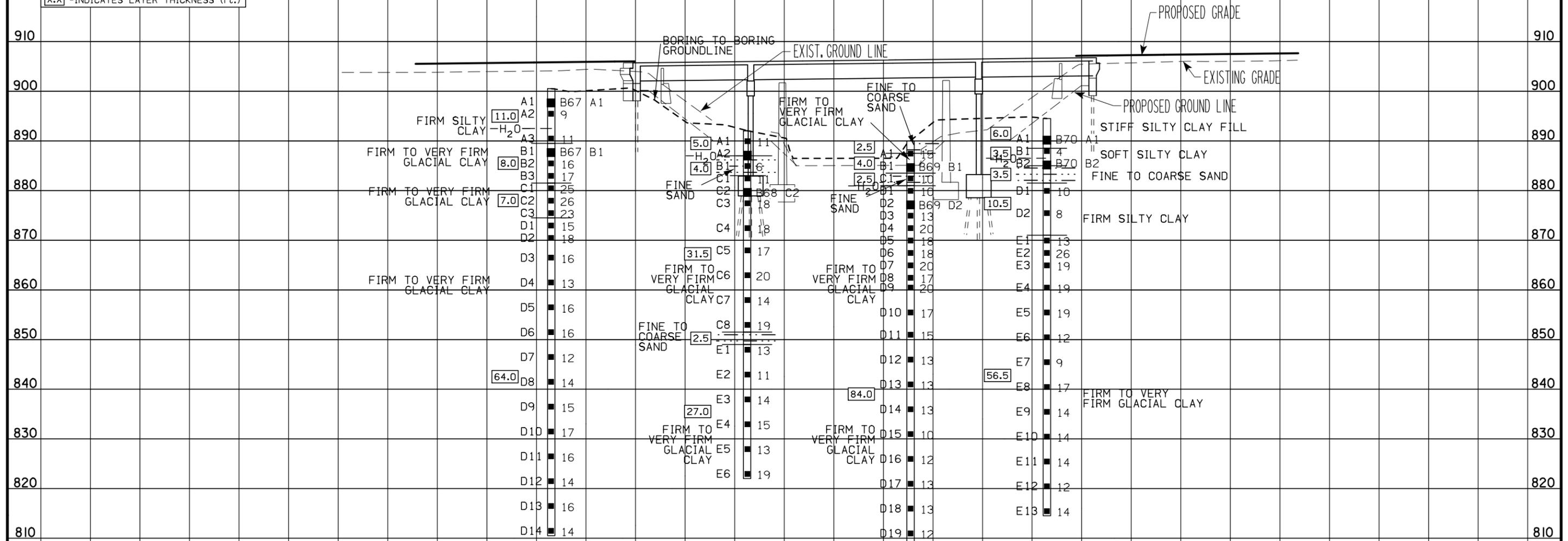
SAND: [Symbol]  
GRAVELLY SAND: [Symbol]  
BOULDERS: [Symbol]

LIMESTONE (L.S.): [Symbol]  
BROKEN & WEATHERED L.S.: [Symbol]  
SANDSTONE: [Symbol]  
SHALE: [Symbol]  
SANDY SOIL: [Symbol]

Water Level Observations (Ft.)

Boring No.	Date Drilled	While Drilling	End of Drilling	Delayed Water Level
B-67	10/02/2013	8	14	8.5 ON 10/07/2013
B-68	10/03/2013	6.5	5	-
B-69	10/02/2013	9	-	-
B-70	10/01/2013	8	8	-

[X.X] -INDICATES LAYER THICKNESS (Ft.)



**SHELBY TUBE CORE DATA**

CORE NO.	B67 A1	B67 B1	B68 A2	B68 C2	B69 B1	B69 D2	B70 A1	B70 B2
DEPTH IN FEET	2	12	4	11.5	4.5	12	3.5	8.5
CLASSIFICATION (AASHTO)	-	-	-	-	-	-	-	A-2-6(3)
COEFF. CONSOL. (SQ. FT /DAY)	-	-	-	-	-	-	-	0.95
TRIAxIAL COMPRESSION	UC	UU						
COHESION - PSF	2730	2930	5400	2620	2990	5130	1620	460
FRICTION COEFF.	-	-	-	-	-	-	-	-
MOISTURE CONTENT %	10	13	15	16	13	14	27	17
DRY DENSITY - PCF	107	124	113	117	111	118	98	108
CU-CONSOLIDATED UNDRAINED								
UU-UNCONSOLIDATED UNDRAINED								
UC-UNCONFINED COMPRESSION (c=1/2 Qu)								

FOR INFORMATION ONLY  
I-35 OVER FOURMILE CREEK SOUTHBOUND PROFILE

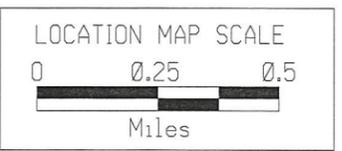
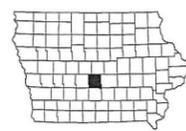
**INDEX OF SHEETS**

No.	DESCRIPTION
<b>A Sheets</b>	<b>Title Sheets</b>
A.1	Title Sheet
<b>C Sheets</b>	<b>Quantities and General Information</b>
C.1	Project Description
C.1	Estimated Project Quantities
C.1	Estimate Reference Information
C.1	Standard Road Plans
C.1	Index of Tabulations
C.2 - 3	Tabulations
<b>D Sheets</b>	<b>Mainline Plan and Profile Sheets</b>
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	Interstate-35 Plan View
* D.3	Interstate-35 Profiles View
<b>G Sheets</b>	<b>Survey Sheets</b>
G.1 - 2	Reference Ties and Bench Marks
G.3 - 12	Horizontal Control Tab. & Super for all Alignments
<b>J Sheets</b>	<b>Traffic Control and Staging Sheets</b>
* J.1	Traffic Control Plan
* J.1	Staging Notes
* J.1	Tabulation of Coordinated Operations
* J.2	Traffic Control & Staging Legend & Symbol Info. Sheet
* J.3 - 4	Staging and Traffic Control Sheets
<b>L Sheets</b>	<b>Geometric, Staking, and Jointing Sheets</b>
L.1 - 3	Bridge Approach Geometrics, Elevations, and Jointing
	* Color Plan Sheets



DESIGN NO. 1018 & 1118

**NO MILEAGE SUMMARY**



**ROADWAY 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.

*Scott E. Port* 04/13/2017  
 Signature Date  
 Scott E. Port, P.E.  
 Printed or Typed Name  
 My license renewal date is December 31, 2018

Pages or sheets covered by this seal: A.1, C.1-C.3, D.1-D.3, G.1-G.12, J.1-J.4, L.1-L.3

**ESTIMATED PROJECT QUANTITIES  
(1 DIVISION PROJECT)**

100-1A  
07-15-97

Item No.	Item Code	Item	Unit	Total	As Built Qty.
1	2214-5145150	PAVEMENT SCARIFICATION	SY	888.9	
2	2301-0690203	BRIDGE APPROACH, BR-203	SY	1800	
3	2303-1043502	HOT MIX ASPHALT HIGH TRAFFIC, SURFACE COURSE, 1/2 IN. MIX, FRICTION L-2	TON	98	
4	2303-1258284	ASPHALT BINDER, PG 58-28H, HIGH TRAFFIC	TON	5.9	
5	2412-0000100	LONGITUDINAL GROOVING IN CONCRETE	SY	3790.1	
6	2503-0500402	BRIDGE END DRAIN, DR-402	EACH	2	
7	2510-6745850	REMOVAL OF PAVEMENT	SY	830	
8	2520-3350010	FIELD LABORATORY	EACH	1	
9	2548-0000100	MILLED SHOULDER RUMBLE STRIPS, HMA SURFACE	STA	4	
10	2548-0000110	ASPHALT EMULSION FOR FOG SEAL (SHOULDER RUMBLE STRIPS)	GAL	4.3	

**PROJECT DESCRIPTION**

100-1D  
10-18-05

This project involves the middle bridge and bridge approaches on I-35 over Fourmile Creek and northbound bridge and bridge approaches on I-35 over Fourmile Creek. Refer to the IM-NHS-035-4(140)92--03-77 I-35 northbound grading project for all grading, traffic control, staging, tbr, sign removal, guardrail removal, erosion control, etc.

**STANDARD ROAD PLANS**

105-4  
10-18-11

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
BR-203	04-21-15	Double Reinforced 12" Approach
BR-213	04-21-15	Bridge Approach (Abutting Pavement)
DR-304	10-18-16	Outlets for Longitudinal, Transverse and Backslope Subdrains
DR-402	10-18-16	Rock Flume for Bridge End Drain
LI-104	10-21-14	Junction box (cast Iron)
PR-201	10-21-14	Runouts for Resurfacing
PR-202	10-21-14	Notches for Resurfacing (with or without Runout)
PV-12	04-19-16	Milled Shoulder Rumble Strips
PV-101	04-19-16	Joints
PV-102	10-18-16	PCC Curb Details
PV-202	04-16-13	Hot Mix Asphalt Resurfacing
TC-1	04-16-13	Work Not Affecting Traffic (Two-Lane or Multi-Lane)

**INDEX OF TABULATIONS**

111-25  
10-18-11

Tabulation	Tabulation Title	Sheet No.
C Sheets		
100-1A	ESTIMATED PROJECT QUANTITIES (1 DIVISION PROJECT)	C.1
100-1D	PROJECT DESCRIPTION	C.1
100-4A	ESTIMATE REFERENCE INFORMATION	C.1
100-25	HMA PAVEMENT	C.2
100-28	LONGITUDINAL GROOVING	C.3
102-5	EXISTING PAVEMENT	C.2
102-16	NOTCHES AND RUNOUTS FOR RESURFACING	C.3
104-8A	SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN	C.3
105-4	STANDARD ROAD PLANS	C.1
110-1	REMOVAL OF PAVEMENT	C.3
111-25	INDEX OF TABULATIONS	C.1
112-6	BRIDGE APPROACH SECTION	C.3
112-10	MILLED RUMBLE STRIPS	C.3

**REFERENCE INFORMATION**

100-4A  
10-29-02

Item No.	Item Code	Description
1	2214-5145150	PAVEMENT SCARIFICATION Refer to Tabulations 100-25 and 102-16 for quantities.
2	2301-0690203	BRIDGE APPROACH, BR-203 Refer to Tabulation 112-6 for quantities. Refer to D Sheets for plan and profile information. Refer to L Sheets for Geometrics.
3	2303-1043502	HOT MIX ASPHALT HIGH TRAFFIC, SURFACE COURSE, 1/2 IN. MIX, FRICTION L-2
4	2303-1258284	ASPHALT BINDER, PG 58-28H, HIGH TRAFFIC Refer to Tabulations 100-25. for quantities. Refer to D Sheets for overlay limits. Refer to L Sheets for geometrics and elevations. HMA overlay to consist of a minimum of 2" depth of hot mix asphalt high traffic surface course, 1/2" mix.
5	2412-0000100	LONGITUDINAL GROOVING IN CONCRETE Refer to Tabulation 100-28 for locations & details.
-	-	-
6	2503-0500402	BRIDGE END DRAIN, DR-402 Refer to Tabulation 104-8A for quantities Refer to D Sheets for plan view information.
7	2510-6745850	REMOVAL OF PAVEMENT Refer to Tab 102-5 for existing pavement information. Refer to Tab 110-1 for quantities.
8	2520-3350010	FIELD LABORATORY
9	2548-0000100	MILLED SHOULDER RUMBLE STRIPS, HMA SURFACE
10	2548-0000110	ASPHALT EMULSION FOR FOG SEAL (SHOULDER RUMBLE STRIPS) Refer to Tabulation 112-10 for quantities.



112-10  
04-19-11

### MILLED RUMBLE STRIPS

See PV-12 and PV-13.

\* Calculated at 18" width for Shoulder.

Location		Length		Type (Centerline, Rt or Lt Shoulder)	Fog Seal* (Milled Rumble Strip) Shoulder	Effective Shoulder Width			Remarks
Road Identification	Station to Station	PCC	HMA			PCC Paved	HMA Paved	Granular\ Earth	
		STA	STA						
INTERSTATE 35	327+07.27	328+07.27	1.00	Left Shoulder	1.1		6.0		
INTERSTATE 35	327+07.27	328+07.27	1.00	Right Shoulder	1.1		8.0		
INTERSTATE 35	331+75.63	332+75.63	1.00	Left Shoulder	1.1		10.0		
INTERSTATE 35	331+75.63	332+75.63	1.00	Right Shoulder	1.1		8.0		
TOTALS:			4.00		4.3				

100-28  
10-19-10

### LONGITUDINAL GROOVING

Location	Total SY	Remarks
SOUTHBOUND BRIDGE - SOUTH BRIDGE APPROACH	157.4	STAGE 1
NORTHBOUND BRIDGE - SOUTH BRIDGE APPROACH	166.0	STAGE 1
SOUTHBOUND BRIDGE	343.5	STAGE 1
NORTHBOUND BRIDGE	343.5	STAGE 1
SOUTHBOUND BRIDGE - NORTH BRIDGE APPROACH	166.0	STAGE 1
NORTHBOUND BRIDGE - NORTH BRIDGE APPROACH	157.4	STAGE 1
NORTHBOUND BRIDGE - SOUTH BRIDGE APPROACH	664.0	STAGE 2
NORTHBOUND BRIDGE	1300.0	STAGE 2
NORTHBOUND BRIDGE - NORTH BRIDGE APPROACH	492.3	STAGE 2
TOTAL:	3790.1	

104-8A  
04-18-17

### SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN

Refer to Standard Road Plan DR-401 and DR-402

Location		Bid Items		PCC Paved Shoulder			Scour Protection (DR-401)			Rock Flume (DR-402)			Remarks
Bridge Station	Bridge Corner	Distance DI-1 or DI-2	PCC Paved Shoulder	Bridge End Drain	Panels Required	Polymer Grid	Modified Subbase	Transition Mat	Turf Reinforced Mat (TRM), Type 2	Macadam Stone Base	Engineering Fabric	Erosion Stone	
		FT	SY	TYPE	A B C or D	SY	TONS	SF	SQ	TONS	SY	TONS	
329+93.82	SE	DI-2	SEE NOTE 1	DR-402	SEE NOTE 1	SEE NOTE 1	SEE NOTE 1			1.460	79.2	49.500	
329+93.82	NE	DI-1	SEE NOTE 1	DR-402	SEE NOTE 1	SEE NOTE 1	SEE NOTE 1			1.460	77.9	48.600	
NOTE 1: REFER TO TABULATION 112-6 FOR FULL DEPTH SHOULDER QUANTITIES										TOTALS:	2.920	157.1	98.100

112-6  
04-18-17

### BRIDGE APPROACH SECTION

Refer to the BR Series.

\* Not a bid item

Location		Approach Pavement			Standard Road Plans BR Series			Subdrain					Remarks							
Bridge Station	End	Skew Ahead		Thickness (T) Inches	Pay Length FT	Non-Reinf. Pavement Area SY	Single- Reinf. Pavement Area SY	Double- Reinf. Pavement Area SY	Approach	Fixed or Movable Abutment	Abutting Pavement	Perforated Subdrain 4" LF		Subdrain Outlet		Porous Backfill CY	Class 'A' Crushed Stone Backfill CY	Modified Subbase TON	Polymer Grid SY	Special Backfill TON
		LEFT	RIGHT											STA	Side					
329+81.05	SOUTH		15	12.0	85.6	56.7	37.8	63.0	BR-203	Movable	BR-213	17.0			3.0		141.740	157.4		STAGE 1
	SOUTH		15	12.0	85.6	56.7	37.8	71.6	BR-203	Movable	BR-213	17.0			3.0		149.480	166.0		STAGE 1
329+81.05	NORTH		15	12.0	85.6	56.7	37.8	71.6	BR-203	Movable	BR-213	17.0			3.0		149.480	166.0		STAGE 1
	NORTH		15	12.0	85.6	56.7	37.8	63.0	BR-203	Movable	BR-213	17.0			3.0		141.740	157.4		STAGE 1
329+93.82	SOUTH		15	12.0	96.6	200.0	133.0	331.0	BR-203	Movable	BR-213	88.0	328+17.27	RT	15.0		603.400	664.0		STAGE 2
329+93.82	NORTH		15	12.0	74.6	200.0	133.0	155.0	BR-203	Movable	BR-213	88.0	331+65.63	RT	15.0		412.810	488.8		STAGE 2
TOTALS:						626.8	417.2	755.2				244.0			42.0		1598.650	1799.6		

102-16  
10-21-14

### NOTCHES AND RUNOUTS FOR RESURFACING

Refer to PR-201 and PR-202.

① Bid item. Applies only to Types 'N1' and 'N3' on PR-202. Refer to 100-25 for remaining values.

Location Station	Type of Notch or Runout	(S) IN	(I) IN	(DI) IN	(L) FT	(M) IN	Pavement Scarification SY	Remarks
327+07.27	Type 'N1'	2.0	0.0		50.0	2.0	NOTE 1	NOTE 1:REFER TO TAB 100-25
328+07.27	Type 'R1'	2.0	0.0		50.0	2.0	NOTE 1	NOTE 1:REFER TO TAB 100-25
331+75.63	Type 'N2'	2.0	0.0		50.0	2.0	NOTE 1	NOTE 1:REFER TO TAB 100-25
332+75.63	Type 'N2'	2.0	0.0		50.0	2.0	NOTE 1	NOTE 1:REFER TO TAB 100-25

110-1  
04-16-13

### REMOVAL OF PAVEMENT

Refer to Tabulation 102-5

\* Not a Bid Item

Begin Station	End Station	Side	Pavement Type	Area SY	Saw Cut* LF	Remarks
328+05.00	329+10.00	NORTHBOUND	COMPOSITE	399.1	38.0	SOUTH OF BRIDGE
330+95.00	331+75.00	NORTHBOUND	COMPOSITE	430.2	40.0	NORTH OF BRIDGE
TOTAL:				829.3	78.0	

# SURVEY SYMBOLS

- IN Storm Sewer Intake
- FW Wire Fence
- INB Storm Sewer Beehive Intake
- PR Electric Riser Pole
- GP Guard Post (Less Than 4 Posts)
- SL Speed Limit Sign
- SI Sign
- TIL Tile Line
- GDL Guard Rail Steel
- LUM Luminaire
- UE Utility Elevation
- WV Water Valve
- GPR Guard Post (4 or More Posts)
- FP Filler Pipe
- OUT Tile Outlet
- MIS Miscellaneous
- PPA Power Pole Co. 1
- AST Above Ground Storage Tank
- LP L.P. Tank
- FLG Flag Poles
- WHD Water Hydrant
- WEL Well
- MH Utility Access (Manhole)
- TPD Telephone Pedestal
- MM Mile Marker Post
- FCL Chain Link and Security Fence
- EB Electrical Box
- TV Satellite TV Dish
- UB Utility Box
- UST Underground Tank
- GV Gas Valve
- WHU RV Water Hook Up
- SEP Septic Tank
- FHD Fire Hydrants
- FWD Wood Fence
- RET Retaining Walls
- D Centerline Draw or Stream (Down)
- BNK Stream Bank
- RIP Rip-Rap
- EW Edge of Water
- DU Centerline Draw or Stream (Up)
- ENT Centerline BL of Entrance
- ENU Edge Unpaved Entrance & Parking
- EG Edge of Gravel Road
- SNP Unpaved Shoulder
- DIK Centerline of Dike or Dam

- F02 FOB Underground Fiber Optic Co. 2
- T1 TLA Underground Telephone Line Co. 1
- E1 ELA Underground Electric Line Co. 1
- F0 FOA Underground Fiber Optic Co. 1
- W WLA Underground Water Line Co. 1
- St.S.2 STB Storm Sewer Line Co. 2
- San. SAA Sanitary Sewer Line Co. 1
- E2 ELB Underground Electric Line Co. 2
- TV TVA Underground TV Cable Co. 1
- F03 FOC Underground Fiber Optic Co. 3

## UTILITY LEGEND

This is a POINT 25 Project and is subject to provisions of IAC 761-115.25

- Mid American Electric
- Mid American Electric
- E1 Mid American Energy - Electric  
Michael Younts  
10510 Douglas Avenue  
Urbandale, IA 50322  
515-252-6565  
515-979-8294 (Mobile)  
myounts@midamerican.com
- E2 Mid American Energy - Electric (Traffic Signals)  
Michael Younts  
10510 Douglas Avenue  
Urbandale, IA 50322  
515-252-6565  
515-979-8294 (Mobile)  
myounts@midamerican.com
- F0 City of Ankeny - Fiber  
Tom Dozler  
220 W. 1st Street  
Ankeny, IA 50023  
(515) 669-0420  
TDozler@AnkenyIowa.gov
- F02 Iowa Comm. Network (ICN) - Fiber  
Mike Broderick  
400 E. 14th Street  
Des Moines, IA 50319  
(515) 725-4610  
mike.broderick@iowa.gov
- F03 Mediacom - Fiber  
Al Roberts  
2205 Ingersoll Avenue  
Des Moines, IA 50312  
(515) 202-8669  
aroberts@mediacomcc.com
- F04 CenturyLink - Fiber  
Ray Montoya  
2103 E. University Ave.  
Des Moines, IA 50317  
(515) 263-7396  
raymond.montoya@centurylink.com
- F05 Iowa DOT - ITS  
Tony Taylor  
515-239-1902  
tony.taylor@dot.iowa.gov
- F06 Windstream - Fiber  
Jim Wiand  
3630 109th Street  
Urbandale, IA 50322  
(515) 382-3180 (Office)  
(515) 787-2270 (Mobile)  
James.Wiand@windstream.com
- F07 Nexgen Communications  
Ryan Rolwes  
3405 SE Crossroads Drive, Ste V  
Grimes, IA 50111  
(515) 369-7131 (Office)  
(515) 401-7979 (Mobile)  
ryan@nexgencom.com
- F08 Aureon Technology (Formerly INS)  
Jeff Klocko  
7760 Office Plaza Drive South  
West Des Moines, IA 50266  
(515) 830-0445  
jeff.klocko@aureon.com
- F09 Unite Private Networks (UPN)  
Jeff Hensley  
13300 Hickman Road, Suite 115  
Clive, IA 50325  
(515) 243-2241 (Office)  
(515) 419-4838 (Mobile)  
jeff.hensley@upnfiber.com
- G Mid American Energy - Gas  
Michael Younts  
10510 Douglas Avenue  
Urbandale, IA 50322  
(515) 252-6565 (Office)  
(515) 979-8294 (Mobile)  
myounts@midamerican.com
- G2 Northern Natural Gas  
Tom Dickson  
1120 Centre Point Drive  
Suite 400  
Mendota, MN 55120  
(651) 456-1777  
(763) 234-2970 (mobile)  
Tom.Dickson@nngco.com
- San. City of Ankeny - Sanitary Sewer  
Roger McFarland  
220 W. 1st Street  
Ankeny, IA 50023  
(515) 460-3747  
rmcfarland@AnkenyIowa.gov
- T1 CenturyLink - Telephone  
Ray Montoya  
2103 E. University Ave.  
Des Moines, IA 50317  
(515) 263-7396  
raymond.montoya@centurylink.com
- TV Mediacom - Television  
Al Roberts  
2205 Ingersoll Avenue  
Des Moines, IA 50312  
(515) 202-8669  
aroberts@mediacomcc.com
- W City of Ankeny - Water  
Shawn Buckner  
220 W. 1st Street  
Ankeny, IA 50023  
(515) 979-6987  
sbuckner@AnkenyIowa.gov
- W2 Des Moines Water Works  
Katie Kinsey  
2201 George Flagg Parkway  
Des Moines, IA 50321  
(515) 283-8796  
kinsey@dmww.com
- St.S City of Ankeny - Stormwater  
Jared Bright  
220 W. 1st Street  
Ankeny, IA 50023  
(515) 229-9539  
jbright@AnkenyIowa.gov

## PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINWORK	Design Color No.	Description
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING	Design Color No.	Description
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

## PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

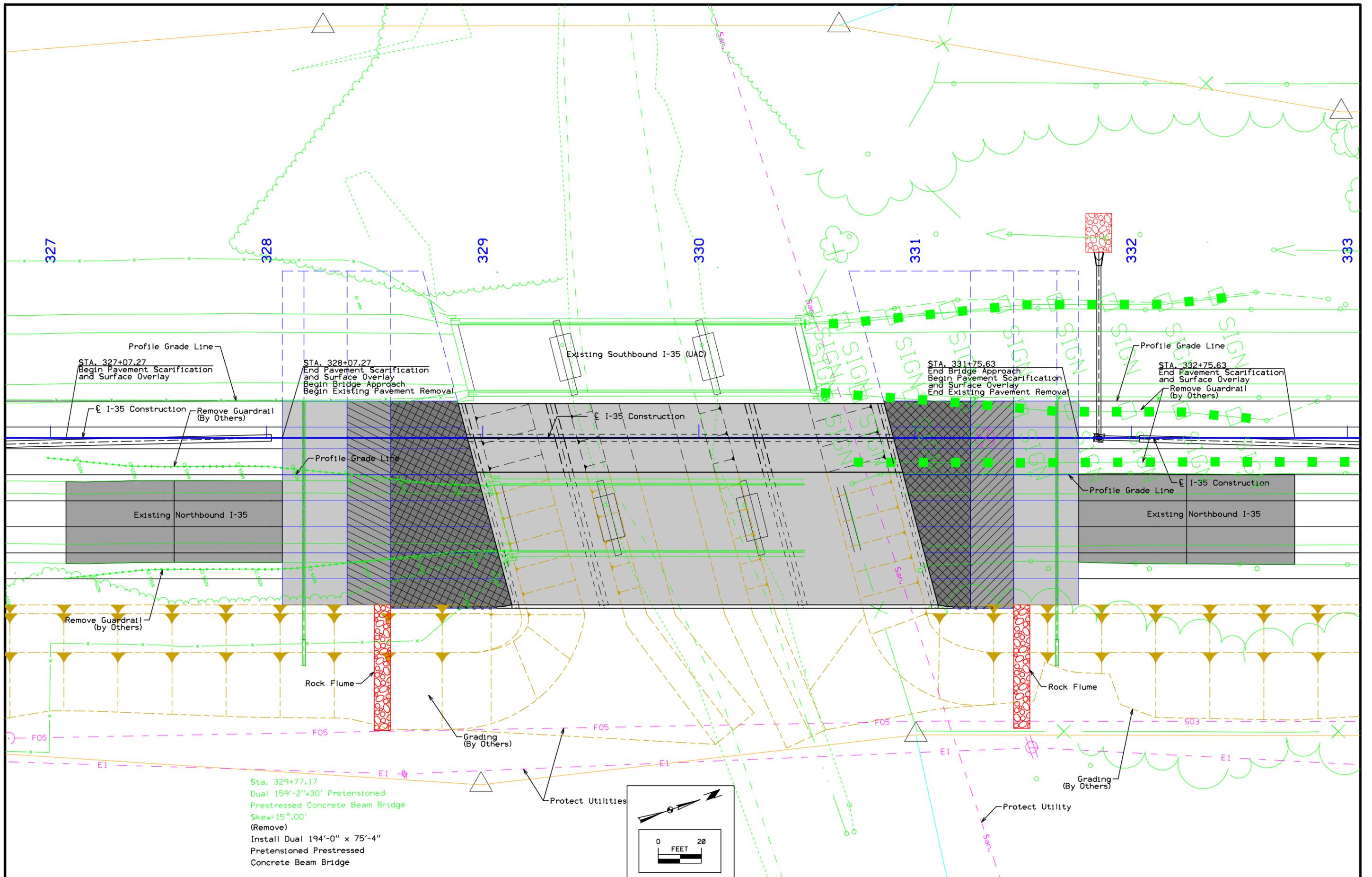
LINWORK	Design Color No.	Description
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

- ### Reference Point
- Survey Line
  - Section Corner
  - Ground Line Intercept
  - Saw Cut
  - Guardrail
  - Trench Drain
  - HighTension Cable Guardrail
  - Sheet Pile
  - Clearing & Grubbing Area
  - Pavement Removal

- ### RIGHT-OF-WAY LEGEND
- Proposed Right-of-Way
  - Existing Right of Way
  - Existing and Proposed Right-of-Way
  - Easement and Existing Right-of-Way
  - Easement (Temporary)
  - Easement
  - Access Control
  - Property Line

# PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



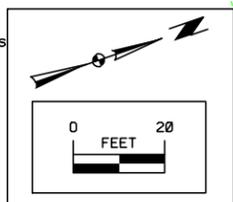
Profile Grade Line  
 STA. 327+07.27  
 Begin Pavement Scarification  
 and Surface Overlay

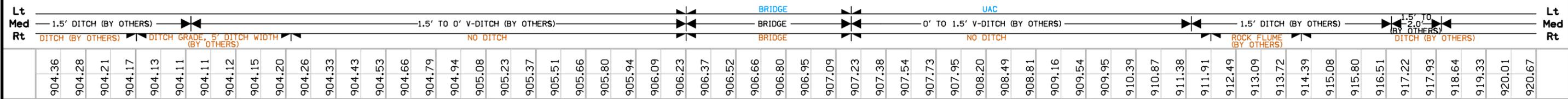
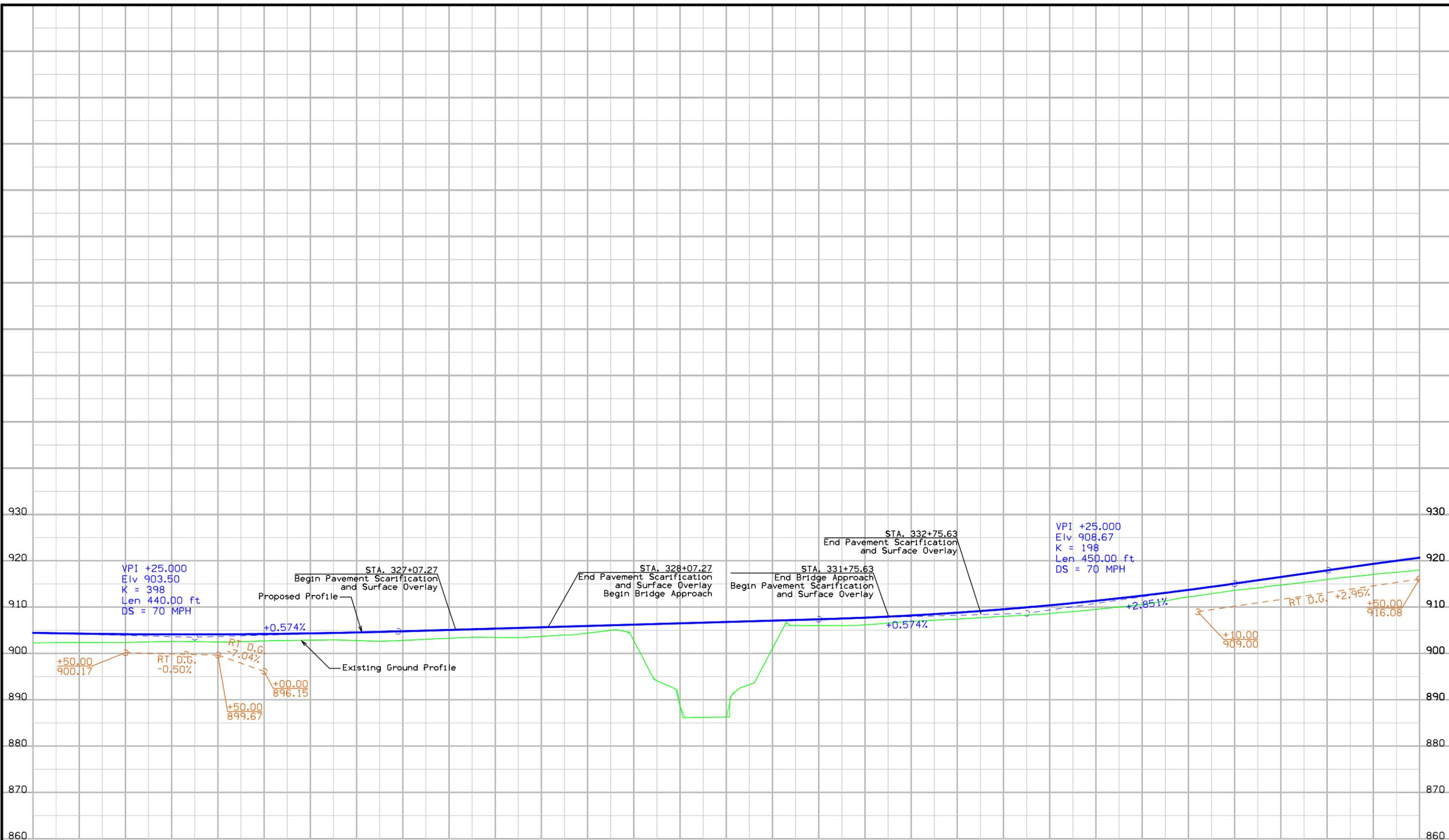
Profile Grade Line  
 STA. 328+07.27  
 End Pavement Scarification  
 and Surface Overlay  
 Begin Bridge Approach  
 Begin Existing Pavement Removal

Profile Grade Line  
 STA. 331+75.63  
 End Bridge Approach  
 Begin Pavement Scarification  
 and Surface Overlay  
 End Existing Pavement Removal

Profile Grade Line  
 STA. 332+75.63  
 End Pavement Scarification  
 and Surface Overlay  
 Remove Guardrail  
 (by Others)

Sta. 329+77.17  
 Dual 159'-2"x30'  
 Prestressed Concrete Beam Bridge  
 Skew=15°.00'  
 (Remove)  
 Install Dual 194'-0" x 75'-4"  
 Pretensioned Prestressed  
 Concrete Beam Bridge





904.36	904.28	904.21	904.17	904.13	904.11	904.11	904.12	904.15	904.20	904.26	904.33	904.43	904.53	904.66	904.79	904.94	905.08	905.23	905.37	905.51	905.66	905.80	905.94	906.09	906.23	906.37	906.52	906.66	906.80	906.95	907.09	907.23	907.38	907.54	907.73	907.95	908.20	908.49	908.81	909.16	909.54	909.95	910.39	910.87	911.38	911.91	912.49	913.09	913.72	914.39	915.08	915.80	916.51	917.22	917.93	918.64	919.33	920.01	920.67
			323	324		325			326		327			328			329			330			331			332			333			334			335			336			337																		

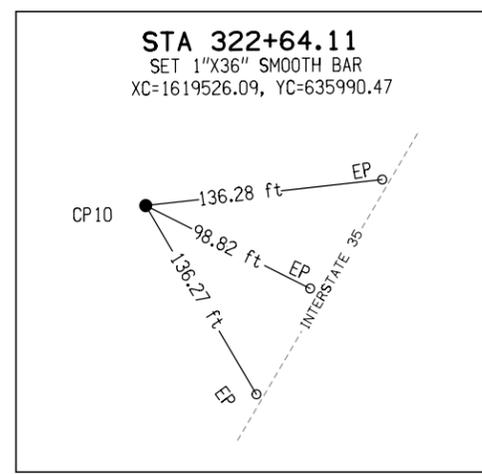
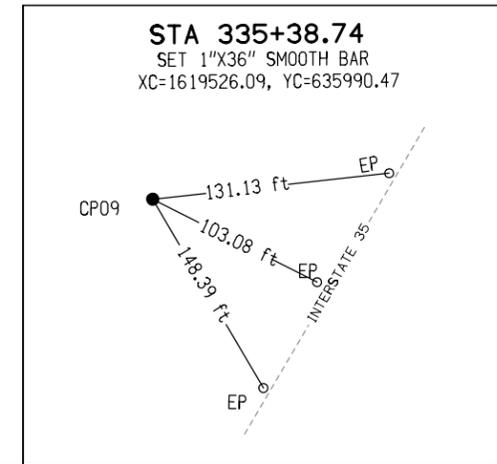
GENERAL INFORMATION

HORIZONTAL DATUM BASED ON IOWA STATE PLANE SOUTH, SCALED FROM POINT #23 (HOWARD R. GREEN) WITH A SCALE FACTOR OF .99995522

VERTICAL DATUM IS NAVD88, WITH ELEVATIONS ESTABLISHED VIA DIGITAL LEVEL LOOP, ORIGINATING ON IDOT BM #827 (ELEV=936.820) FROM IDOT PROJECT #

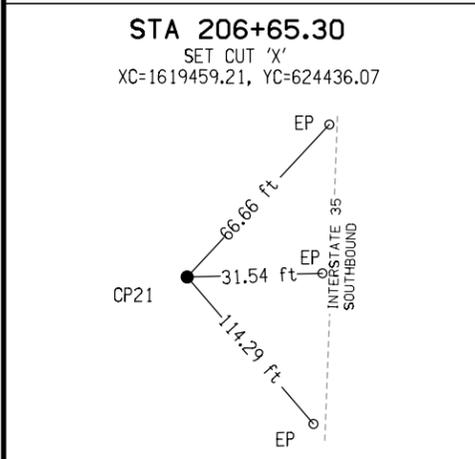
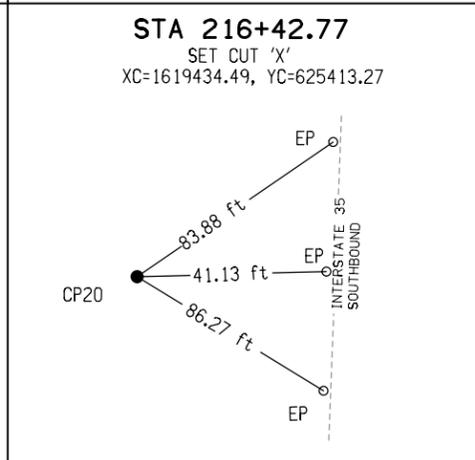
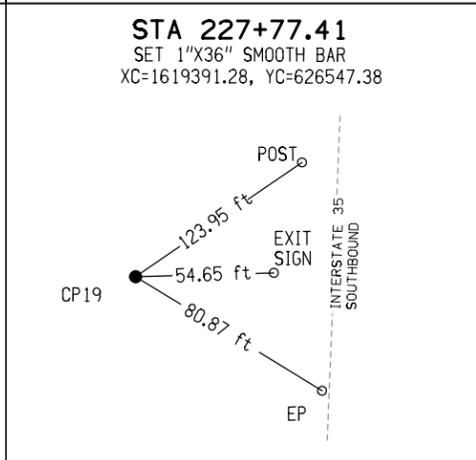
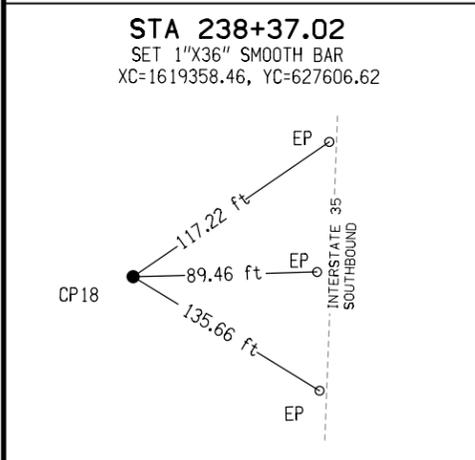
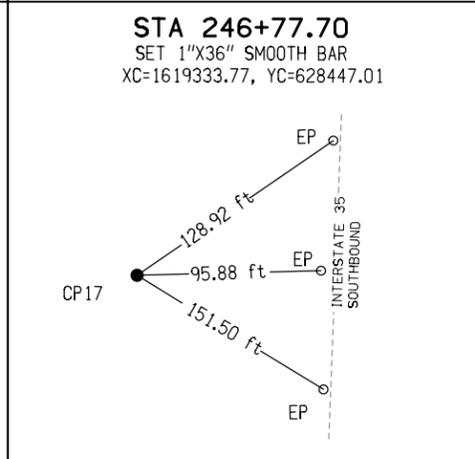
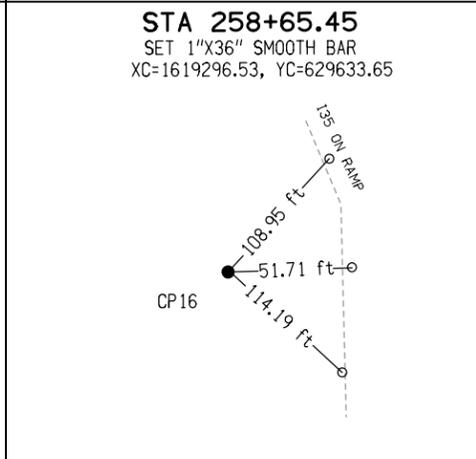
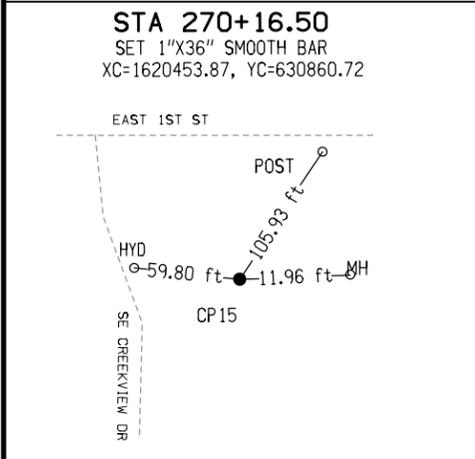
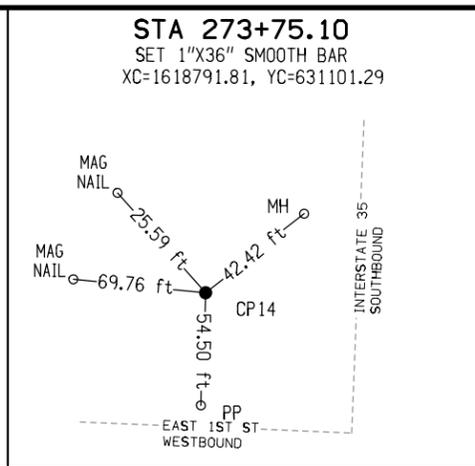
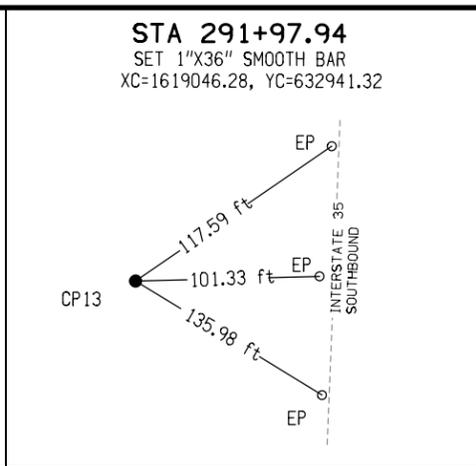
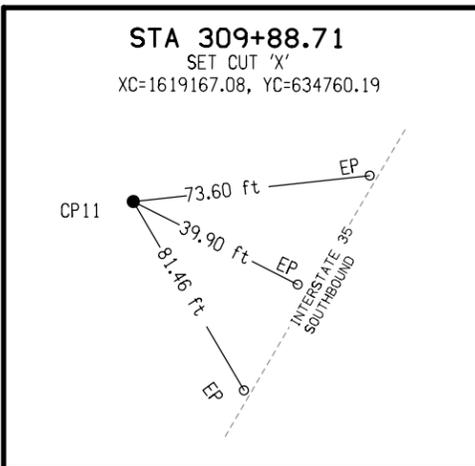
CONTROL POINT INFORMATION			
CONTROL POINT	NORTHING	EASTING	DESCRIPTION
CP1	624695.50	1619613.00	SET PK NAIL IN EAST SHOULDER OF NORTHBOUND I35, EVEN WITH NORTH BUILDING LINE OF SLUMBERLAND.
CP2	629077.21	1619522.66	SET PK NAIL AT INTERSECTION OF PAINT STRIPING FOR NORTHBOUND I35 AND E. 1ST ST. OFF RAMP
CP3	630972.41	1621730.68	SET PK NAIL IN SOUTH SHOULDER OF E. 1ST ST., 600'+/- EAST OF INTERSECTION WITH FRISK DRIVE
CP4	632475.57	1619281.93	SET PK NAIL AT INTERSECTION OF PAINT STRIPING FOR NORTHBOUND I35 AND E. 1ST ST. ON RAMP
CP5	637143.11	1620134.70	SET PK NAIL IN EAST SHOULDER OF NORTHBOUND I35 AT SPOT WHERE 18TH ST. REST AREA OFF RAMP BEGINS.
CP6	632399.09	1619187.95	SET PK NAIL AT INTERSECTION OF PAINT STRIPING FOR SOUTHBOUND I35 AND E. 1ST ST. OFF RAMP
CP7	631034.95	1617875.84	SET GIN SPIKE IN TOP OF CURB ON E. 1ST ST., DUE SOUTH OF BURGER KING SIGN.
CP8	629401.77	1619402.36	SET PK NAIL AT INTERSECTION OF PAINT STRIPING FOR SOUTHBOUND I35 AND E. 1ST ST. ON RAMP.
CP9	637196.35	1619939.07	SET 1"x36" SMOOTH BAR, 10'+/- EAST OF WEST ROW LINE, 250'+/- NORTH OF MILE MARKER 93.8.
CP10	635990.47	1619526.09	SET 1"x36" SMOOTH BAR, 10'+/- EAST OF WEST ROW LINE, 25'+/- SOUTH OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP.
CP11	634760.19	1619167.08	SET CUT 'X' IN TOP OF NORTH CORNER OF INLET HEADWALL OF RCB UNDER I35 MILE MARKER 93.35
CP12	634060.99	1619025.89	SET 1"x36" SMOOTH BAR IN WEST ROW, 15'+/- SOUTH OF BLUE GAS EXIT SIGN, 100'+/- NORTH OF MILE MARKER 93.2.
CP13	632941.32	1619046.28	SET 1"x36" SMOOTH BAR IN WEST ROW, 5' EAST OF WEST ROW LINE, AND 100'+/- OF MILE MARKER 93.0.
CP14	631101.29	1618791.81	SET 1"x36" SMOOTH BAR AT NW QUADRANT ON E. 1ST ST. AND SOUTHBOUND I35 OFF RAMP, 50'+/- NORTH OF LIGHT POLE.
CP15	630860.72	1620453.87	SET 1"x36" SMOOTH BAR IN SE QUADRANT OF CREEKVIEW AND E. 1ST ST., 50'+/- EAST OF HYDRANT, DUE NORTH OF EAST EDGE OF CREEKVIEW.
CP16	629633.65	1619296.52	SET 1"x36" SMOOTH BAR, WEST ROW OF I35, JUST OFF OF SOUTHBOUND ON RAMP, 25'+/- EAST OF ROW LINE AT MILE MARKER 92.4.
CP17	628447.01	1619333.77	SET 1"x36" SMOOTH BAR IN WEST ROW OF I35, 10'+/- WEST OF ROW FENCE, DIRECTLY EAST OF MILL POND OIL PUMP, 150'+/- SOUTH OF MILE MARKER 92.2.
CP18	627606.62	1619358.46	SET 1"x36" SMOOTH BAR IN WEST ROW OF I35, 25'+/- NORTH OF MILE MARKER 92.0 AT TOP OF BACKSLOPE.
CP19	626547.38	1619391.28	SET 1"x36" SMOOTH BAR IN WEST ROW OF I35, 25'+/- NORTH OF MILE MARKER 91.8, DUE WEST OF EXIT 90 SIGN.
CP20	625413.27	1619434.49	SET CUT 'X' IN NORTH CORNER INLET OF HEADWALL ON RCB UNDER I35, 50'+/- SOUTH OF MILE MARKER 91.6.
CP21	624436.07	1619459.21	SET CUT 'X' ON TOP OF INLET FLUME OF 48" RCP, WEST ROW OF I35, 100'+/- NORTH OF MILE MARKER 91.4.

BENCHMARKS	ELEVATION
No. 9 Sta. 335+38.74 152.88' LT SET 1"x36" SMOOTH BAR 10'+/- EAST OF WEST ROW LINE 250'+/- NORTH OF MILE MARKER 93.8 ON I-35-----	919.38
No. 10 Sta. 322+64.11 148.31' LT SET 1"x36" SMOOTH BAR, 10'+/- EAST OF WEST ROW LINE, 25'+/- SOUTH OF MILE MARKER 93.6 AND IN LINE WITH 18" RCP-----	913.93
No. 11 Sta. 309+88.71 91.00' LT SET CUT "X" IN TOP OF NORTH CORNER OF INLET HEADWALL OF RCB UNDER I-35 MILE MARKER 93.35-----	902.48
No. 12 Sta. 302+98.61 115.95' LT SET 1"x36" SMOOTH BAR IN WEST ROW, 15'+/- SOUTH OF BLUE EAST EXIT 92 SIGN 100'+/- NORTH OF MILE MARKER 93.2-----	911.51
No. 13 Sta. 291+97.94 173.56' LT SET 1"x36" SMOOTH BAR IN WEST ROW 5'+/- EAST OF WEST ROW LINE AND 100'+/- NORTH OF MILE MARKER 93.0-----	918.35
No. 14 Sta. 273+75.10 599.90' LT SET 1"x36" SMOOTH BAR AT NW QUADRANT ON E. 1ST ST. AND SOUTHBOUND I35 OFF RAMP, 50'+/- NORTH OF LIGHT POLE-----	922.09
No. 15 Sta. 270+16.50 1040.74' RT SET 1"x36" SMOOTH BAR SE QUADRANT CREEKVIEW AND E. 1ST ST., 50'+/- EAST OF HYDRANT, DUE NORTH OF OF EAST EDGE OF CREEKVIEW-----	896.74
No. 16 Sta. 258+65.45 178.22' LT SET 1"x36" SMOOTH BAR W OF I35, JUST OFF OF SB ON RAMP, 25'+/- EAST OF ROW LINE AT MILE MARKER 92.4-----	911.96
No. 17 Sta. 246+77.70 159.26' LT SET 1"x36" SMOOTH BAR IN WEST ROW OF I35, 10'+/- WEST OF ROW FENCE DIRECTLY EAST OF MILLPOND OIL PUMP, 150'+/- SOUTH OF MM 92.2-----	915.70
No. 18 Sta. 238+37.02 147.41' LT SET 1"x36" SMOOTH BAR IN WEST ROW I-35, 25'+/- NORTH OF MILE MARKER 92.0 AT TOP OF BACKSLOPE-----	914.58
No. 19 Sta. 227+77.41 130.80' LT SET 1"x36" SMOOTH BAR IN WEST ROW I35, 25'+/- NORTH OF MILE MARKER 91.8, DUE WEST OF EXIT 90 SIGN-----	912.04
No. 20 Sta. 216+42.77 104.94' LT SET CUT "X" IN NORTH CORNER INLET HEADWALL ON RCB UNDER I35, 30'+/- SOUTH OF MILE MARKER 91.6-----	908.47
No. 21 Sta. 206+65.30 95.44' LT SET CUT X-----	922.61



**DETAILS OF REFERENCE INFORMATION**

All References are Plumb Distances unless otherwise noted.



**DETAILS OF REFERENCE INFORMATION**

All References are Plumb Distances  
unless otherwise noted.

POT Sta 2166+24.73

2170  
ORALABOR RAMP A

PC Sta 2173+23.43

2175

PI Sta 2176+08.34

PT Sta 2178+87.59

2180

ORALABOR RAMP A

2185

POT Sta 2189+08.42

Curve Data  
Δ = 19° 44' 44.95" (LT)  
T = 284.90  
R = 564.16  
PI = 1,637.00  
E = 24.61

165

170

INTERSTATE 35 SB

175

INTERSTATE 35 NB

180

185

190

INTERSTATE 35 SB

195

INTERSTATE 35 NB

195

INTERSTATE 35 SB

200

205

210

215

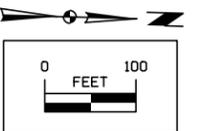
INTERSTATE 35 SB

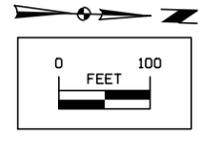
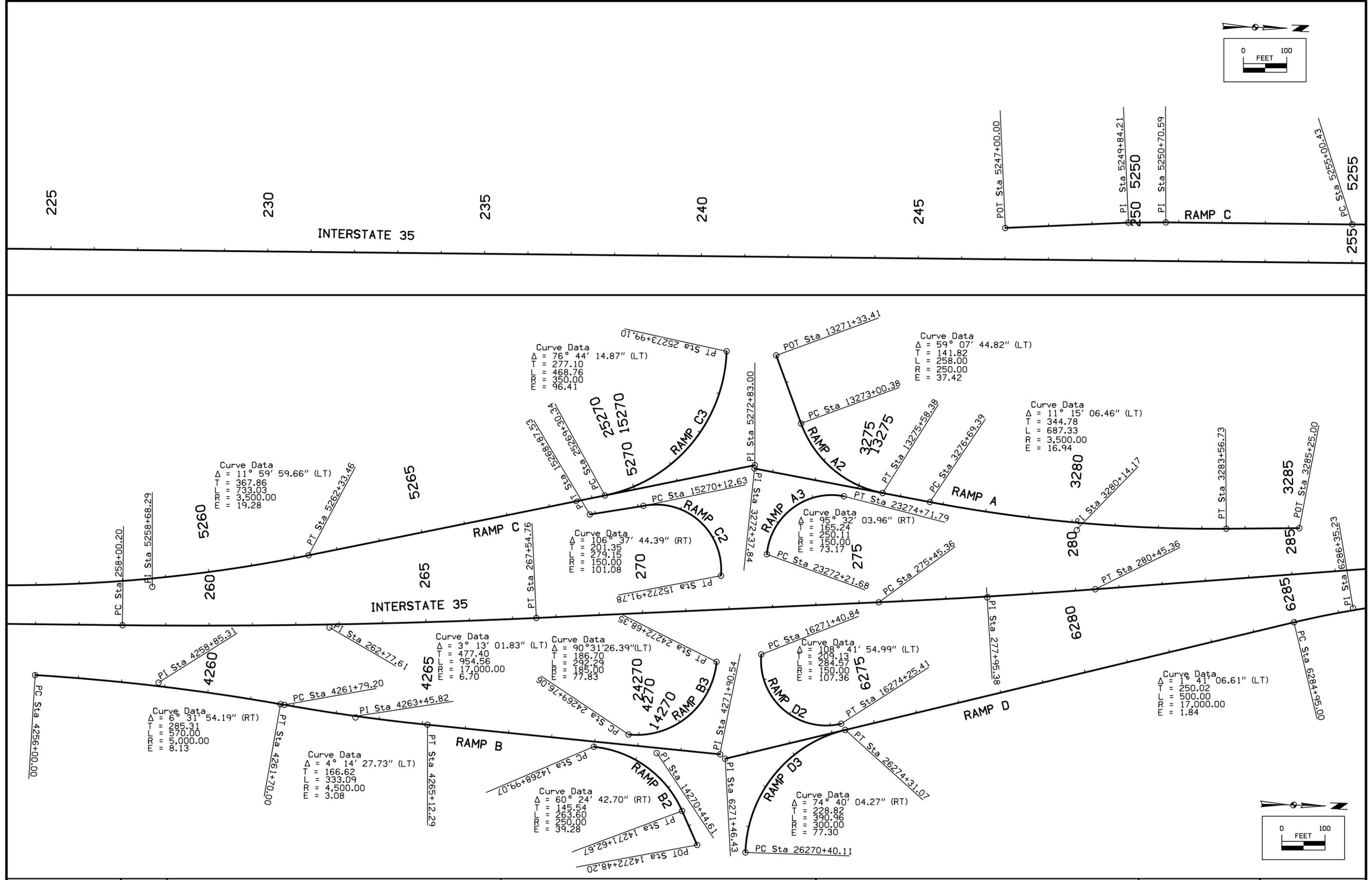
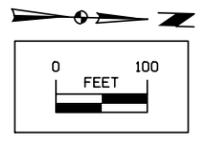
220

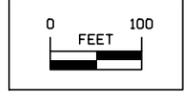
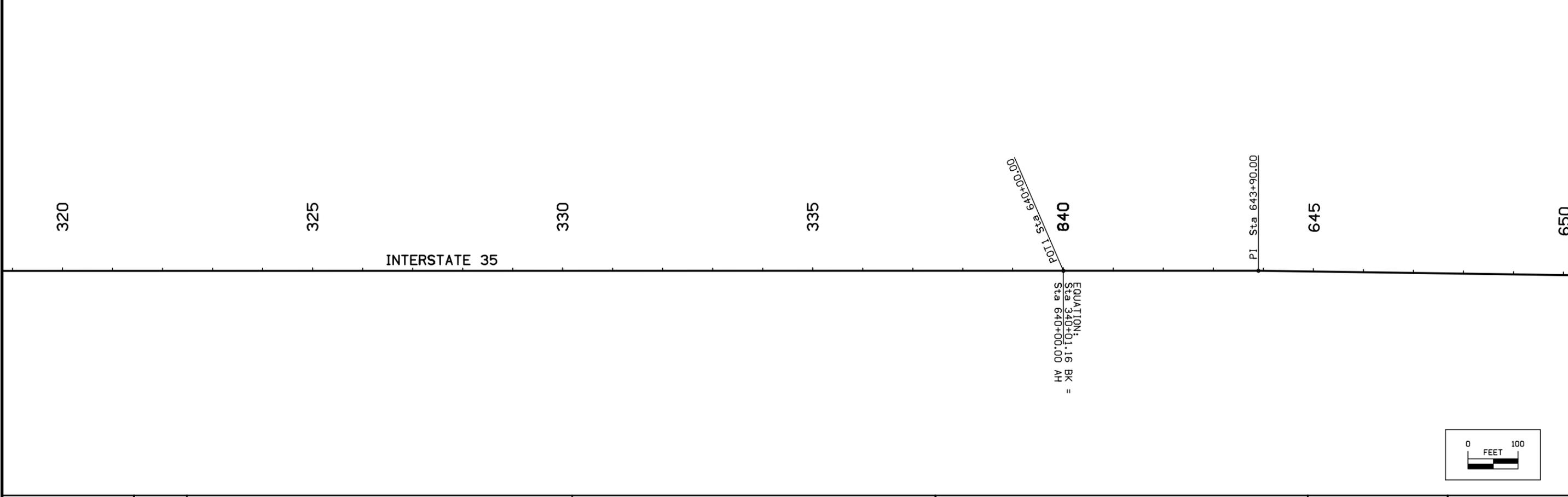
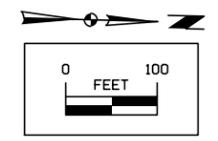
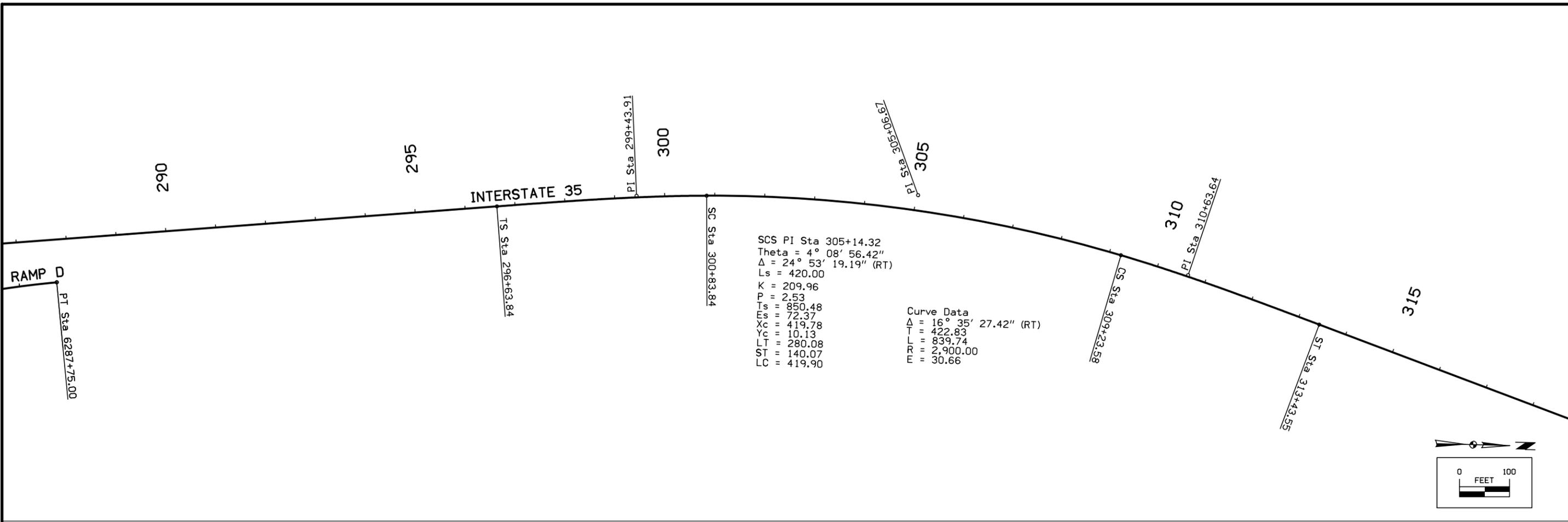
INTERSTATE 35 NB

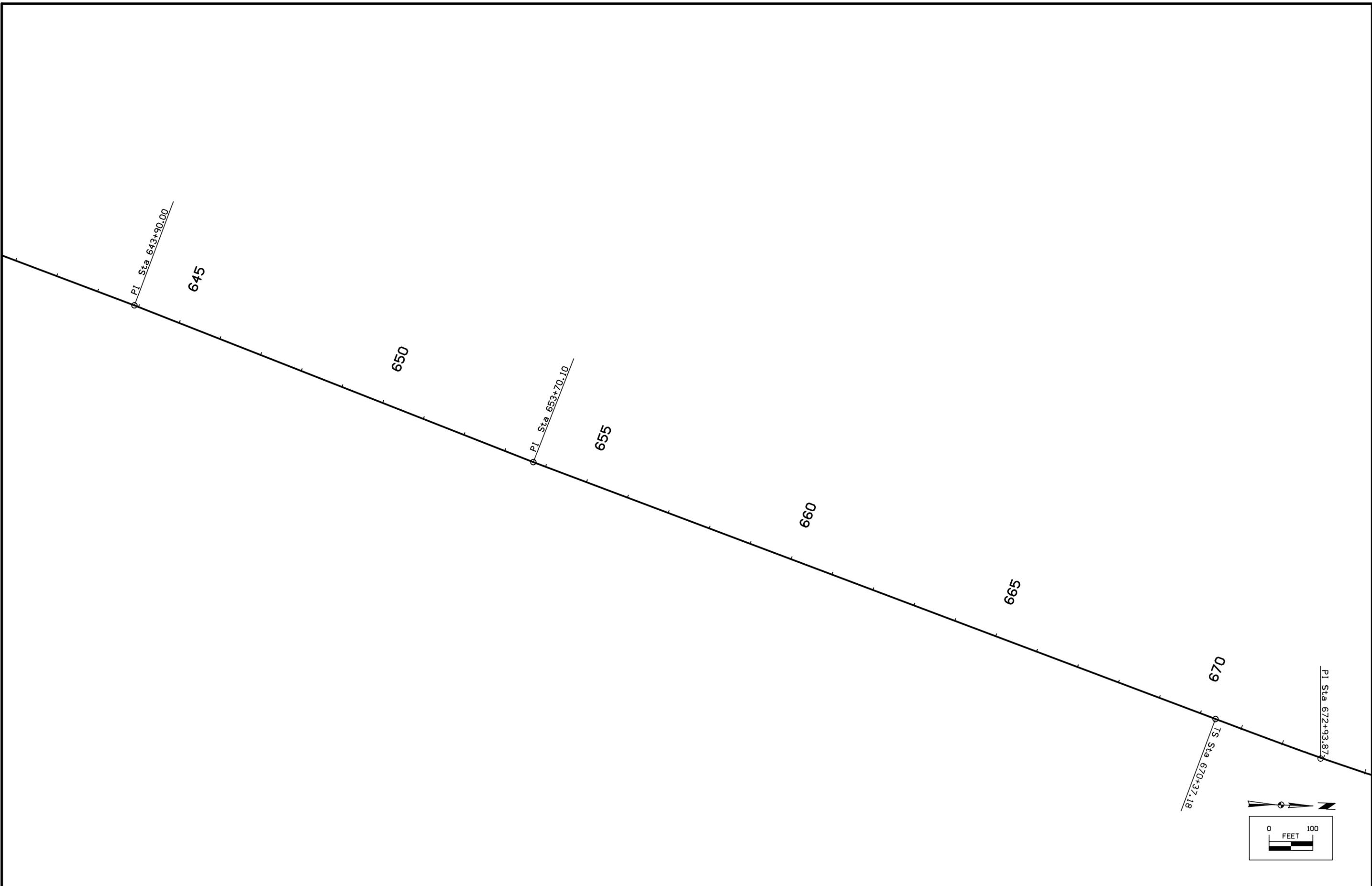
INTERSTATE 35 NB

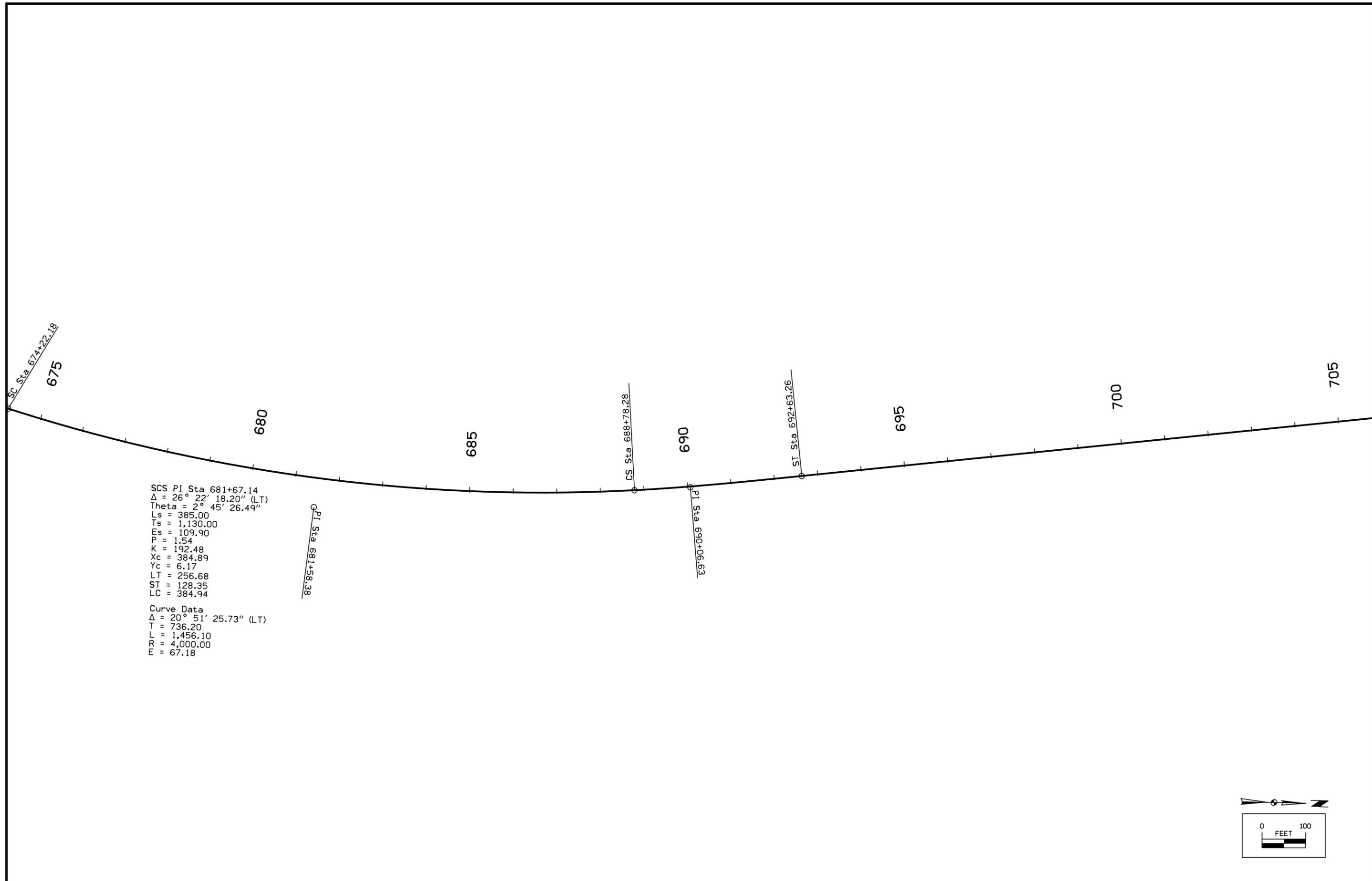
225



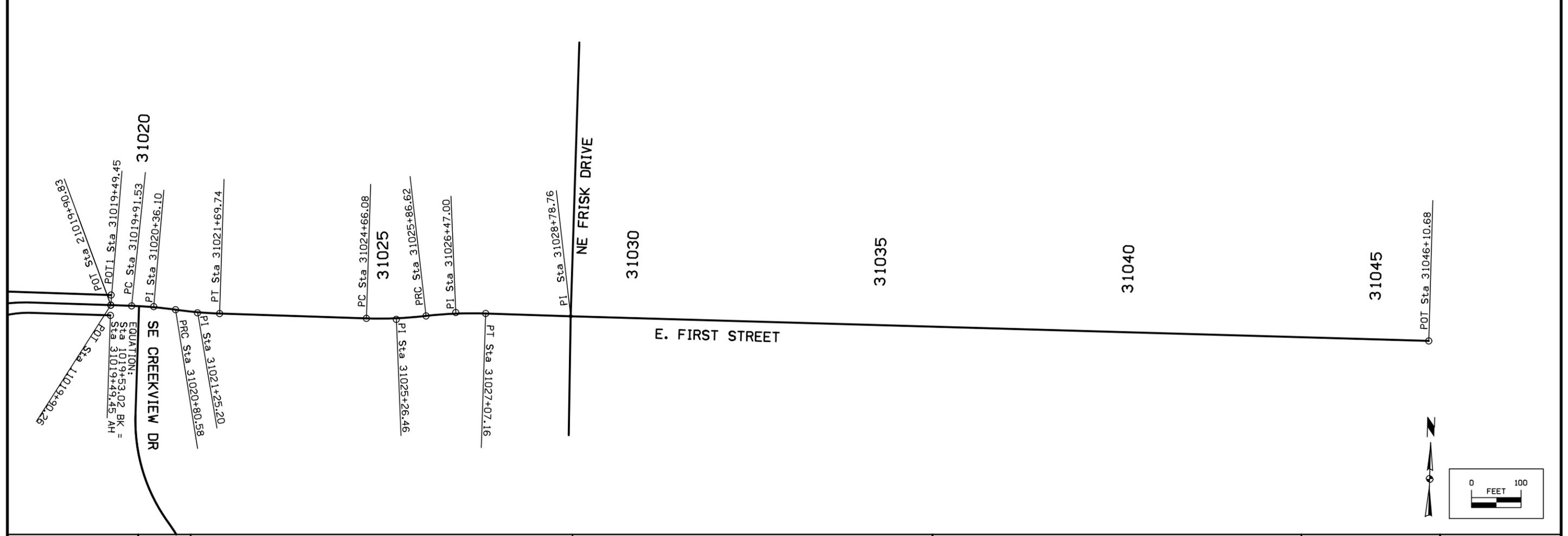
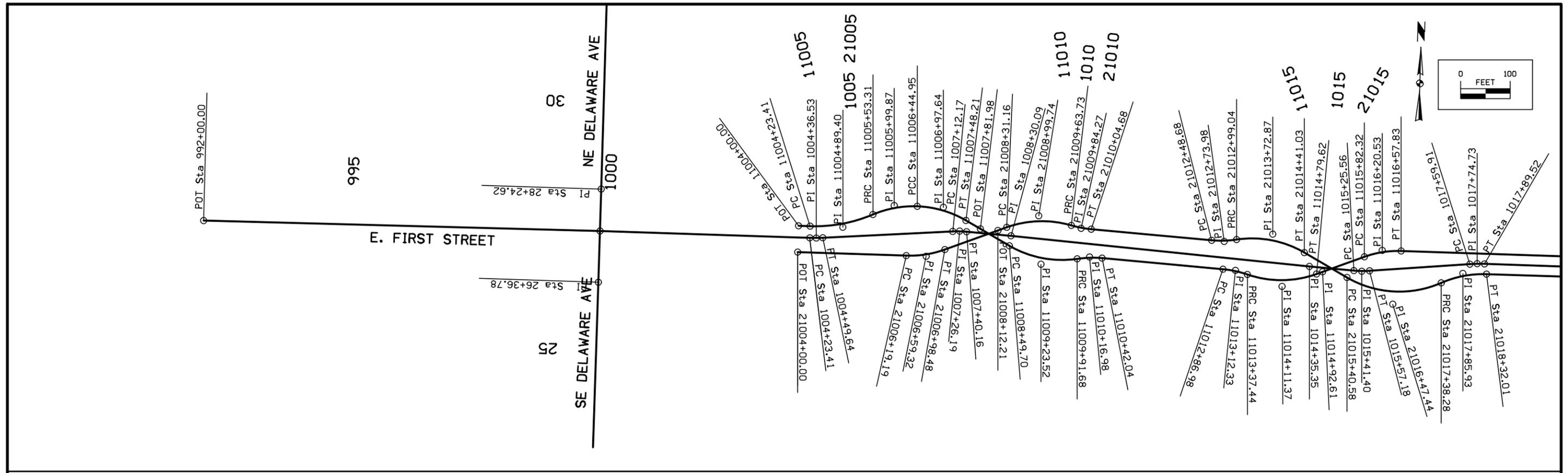


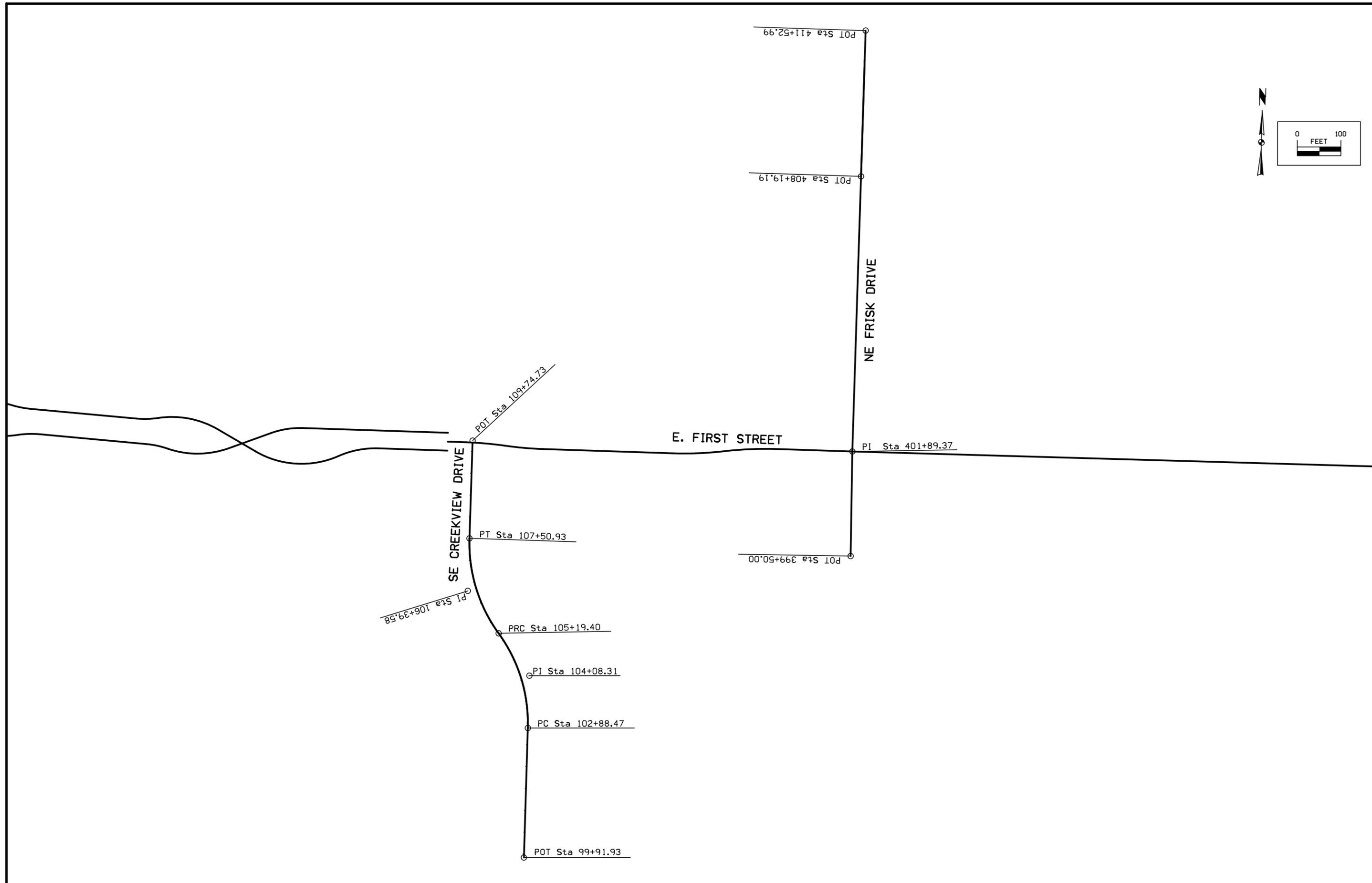
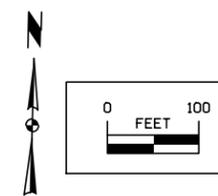






SCS PI Sta 681+67.14  
 $\Delta = 26^\circ 22' 18.20''$  (LT)  
 Theta =  $2^\circ 45' 26.49''$   
 Ls = 385.00  
 Ts = 1,130.00  
 Es = 109.90  
 P = 1.54  
 K = 192.48  
 Xc = 384.89  
 Yc = 6.17  
 LT = 256.68  
 ST = 128.35  
 LC = 384.94  
  
 Curve Data  
 $\Delta = 20^\circ 51' 25.73''$  (LT)  
 T = 736.20  
 L = 1,456.10  
 R = 4,000.00  
 E = 67.18





ALIGNMENT COORDINATES

101-16  
10-20-09

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
POINT CL1	Interstate 35	108+32.89	614,606.26	1,619,704.72															
CURVE I35-1	Interstate 35						258+00.20	629,571.82	1,619,475.84	262+77.61	630,049.17	1,619,468.54	267+54.76	630,525.36	1,619,434.46				
CURVE I35-2	Interstate 35						275+45.36	631,313.94	1,619,378.03	277+95.38	631,563.32	1,619,360.18	280+45.36	631,812.07	1,619,335.01				
SPIRAL I35-3B	Interstate 35				296+63.84	633,422.32	1,619,172.05									300+83.84	633,840.99	1,619,139.87	
CURVE I35-3	Interstate 35						300+83.84	633,840.99	1,619,139.87	305+06.67	634,263.65	1,619,127.85	309+23.58	634,672.14	1,619,237.01				
SPIRAL I35-3A	Interstate 35				309+23.58	634,672.14	1,619,237.01									313+43.55	635,072.08	1,619,364.85	
POINT CL2	Interstate 35	640+00.00	637,583.23	1,620,234.91															
POINT CL3	Interstate 35	643+90.00	637,951.73	1,620,362.59															
POINT CL4	Interstate 35	653+70.10	638,873.15	1,620,696.66															
SPIRAL I35-4B	Interstate 35				670+37.18	640,448.35	1,621,242.43									674+22.18	640,814.07	1,621,362.61	
CURVE I35-4	Interstate 35						674+22.18	640,814.07	1,621,362.61	681+58.38	641,520.49	1,621,569.89	688+78.28	642,254.42	1,621,512.07				
SPIRAL I35-4A	Interstate 35				688+78.28	642,254.41	1,621,512.07									692+63.26	642,637.00	1,621,469.54	
CURVE I35-5	Interstate 35						710+42.10	644,401.58	1,621,244.70	716+07.01	644,961.95	1,621,173.29	721+71.08	645,526.56	1,621,154.85				
POINT CL5	Interstate 35	733+56.20	646,711.04	1,621,116.15															
POINT RAMPA1	RAMP A	3272+37.84	630,999.36	1,619,077.75															
CURVE RAMPA-1	RAMP A						3276+69.39	631,425.70	1,619,144.19	3280+14.17	631,765.96	1,619,199.84	3283+56.73	632,110.53	1,619,188.02				
POINT RAMPA2	RAMP A	3285+25.00	632,278.70	1,619,182.25															
POINT RAMPA21	RAMP A	13271+33.41	631,062.59	1,618,816.26															
CURVE RAMPA2-1	RAMP A						13273+00.38	631,124.01	1,618,971.52	13274+42.20	631,176.18	1,619,103.39	13275+58.38	631,316.14	1,619,126.28				
CURVE RAMPA3-1	RAMP A						23272+21.68	631,052.92	1,619,274.20	23273+86.92	631,063.74	1,619,109.32	23274+71.79	631,226.81	1,619,135.99				
CURVE RAMPB-1	RAMP B						4256+00.00	629,373.43	1,619,595.89	4258+85.31	629,658.57	1,619,605.78	4261+70.00	629,940.73	1,619,648.04				
CURVE RAMPB-2	RAMP B						4261+79.20	629,949.83	1,619,649.40	4263+45.82	630,114.61	1,619,674.08	4265+12.29	630,280.77	1,619,686.50				
POINT RAMPB1	RAMP B	4271+90.54	630,957.14	1,619,737.09															
CURVE RAMPB2-1	RAMP B						14268+99.07	630,665.58	1,619,727.32	14270+44.61	630,810.71	1,619,738.17	14271+62.67	630,872.94	1,619,869.74				
POINT RAMPB22	RAMP B	14272+48.20	630,909.50	1,619,947.06															
CURVE RAMPB3-1	RAMP B						24269+76.06	630,745.04	1,619,697.16	24271+62.76	630,931.22	1,619,711.08	24272+68.35	630,943.44	1,619,524.78				
POINT RAMPC1	RAMP C	5247+00.00	628,470.64	1,619,420.32															
POINT RAMPC2	RAMP C	5249+84.21	628,754.17	1,619,400.57															
POINT RAMPC3	RAMP C	5250+70.59	628,840.50	1,619,398.01															
CURVE RAMPC-1	RAMP C						5255+00.43	629,270.29	1,619,391.44	5258+68.29	629,638.11	1,619,385.82	5262+33.46	629,996.72	1,619,303.84				
POINT RAMPC4	RAMP C	5272+83.00	631,019.87	1,619,069.96															
POINT RAMPC21	RAMP C	15268+87.53	630,642.37	1,619,193.18															
CURVE RAMPC2-1	RAMP C						15270+12.63	630,765.34	1,619,170.20	15272+13.98	630,961.63	1,619,125.33	15272+91.78	630,948.45	1,619,326.24				
CURVE RAMPC3-1	RAMP C						25269+30.34	630,676.08	1,619,148.54	25272+07.44	630,946.21	1,619,086.79	25273+99.10	630,948.08	1,618,809.71				
POINT RAMPD1	RAMP D	6271+46.43	630,968.91	1,619,476.99															
CURVE RAMPD-1	RAMP D						6284+95.00	632,271.87	1,619,399.18	6286+35.23	632,407.35	1,619,363.02	6287+75.00	632,546.56	1,619,346.11				
CURVE RAMPD2-1	RAMP D						16271+40.84	631,045.97	1,619,504.83	16273+49.96	631,032.28	1,619,713.51	16274+25.41	631,234.33	1,619,659.58				
CURVE RAMPD3-1	RAMP D						26270+40.11	631,021.31	1,619,961.40	26272+68.93	631,022.86	1,619,732.59	26274+31.07	631,243.94	1,619,673.57				
POINT FIRST10	East First St.	992+00.00	631,005.33	1,617,486.57															
POINT FIRST11	East First St.	999+99.99	631,005.11	1,618,286.56															
CURVE FIRST_OR-1	East First St.						1004+23.41	631,002.25	1,618,709.97	1004+36.53	631,002.17	1,618,723.09	1004+49.64	631,003.14	1,618,736.18				
CURVE FIRST_OR-2	East First St.						1007+12.17	631,022.64	1,618,997.98	1007+26.19	631,023.68	1,619,011.96	1007+40.16	631,022.76	1,619,025.95				
POINT FIRST12	East First St.	1008+30.09	631,016.87	1,619,115.68															
POINT FIRST13	East First St.	1014+35.35	630,970.76	1,619,719.19															
CURVE FIRST_OR-3	East First St.						1015+25.56	630,964.79	1,619,809.20	1015+41.40	630,963.74	1,619,825.01	1015+57.18	630,965.20	1,619,840.79				
CURVE FIRST_OR-4	East First St.						1017+59.91	630,983.81	1,620,042.66	1017+74.73	630,985.17	1,620,057.41	1017+89.52	630,985.07	1,620,072.23				
POINT EQ1	East First St.	31019+49.45	630,983.96	1,620,235.73															
CURVE FIRST_OR-5	East First St.						31019+91.53	630,983.68	1,620,277.81	31020+36.10	630,983.38	1,620,322.37	31020+80.58	630,978.25	1,620,366.64				
CURVE FIRST_OR-6	East First St.						31020+80.58	630,978.25	1,620,366.64	31021+25.20	630,973.11	1,620,410.97	31021+69.74	630,972.81	1,620,455.59				
CURVE FIRST_OR-7	East First St.						31024+66.08	630,970.82	1,620,751.93	31025+26.46	630,970.41	1,620,812.30	31025+86.62	630,978.84	1,620,872.09				
CURVE FIRST_OR-8	East First St.						31025+86.62	630,978.84	1,620,872.09	31026+47.00	630,987.27	1,620,931.88	31027+07.16	630,986.86	1,620,992.26				
POINT FIRST14	East First St.	31028+78.76	630,985.70	1,621,163.85															
POINT FIRST15	East First St.	31046+10.68	630,981.03	1,622,895.77															
POINT DDIEB1	East First St.	21004+00.00	630,972.91	1,618,686.36															
CURVE DDIEB-1	East First St.						21006+19.19	630,971.43	1,618,905.55	21006+59.32	630,971.16	1,618,945.67	21006+98.48	630,985.70	1,618,983.06				
POINT DDIEB2	East First St.	21008+12.21	631,026.92	1,619,089.06															
CURVE DDIEB-2	East First St.						21008+31.16	631,033.78	1,619,106.72	21008+99.74	631,058.64	1,619,170.64	21009+63.73	631,040.97	1,619,236.91				
CURVE DDIEB-3	East First St.						21009+63.73	631,040.97	1,619,236.91	21009+84.27	631,035.68	1,619,256.75	21010+04.68	631,034.34	1,619,277.25				
CURVE DDIEB-4	East First St.						21012+48.68	631,018.37	1,619,520.73	21012+73.98	631,016.71	1,619,545.97	21012+99.04	631,021.10	1,619,570.89				
CURVE DDIEB-5	East First St.						21012+99.04	631,021.10	1,619,570.89	21013+72.87	631,033.90	1,619,643.60	21014+41.03	630,998.39	1,619,708.32				
CURVE DDIEB-6	East First St.						21015+40.58	630,950.50	1,619,795.60	21016+47.44	630,899.10	1,619,889.28	21017+38.28	630,944.58	1,619,985.99				
CURVE DDIEB-7	East First St.						21017+38.28	630,944.58	1,619,985.99	21017+85.93	630,964.86	1,620,029.11	21018+32.01	630,964.54	1,620,076.77				
POINT DDIEB3	East First St.	21019+90.83	630,963.46	1,620,235.59															

**ALIGNMENT COORDINATES**

101-16  
10-20-09

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
DDIWB1	East First St.	11004+00.00	631,025.91	1,618,686.72															
DDIWB-1	East First St.						11004+23.41	631,025.75	1,618,710.13	11004+89.40	631,025.31	1,618,776.11	11005+53.31	631,052.59	1,618,836.19				
DDIWB-2	East First St.						11005+53.31	631,052.59	1,618,836.19	11005+99.87	631,071.84	1,618,878.58	11006+44.95	631,071.37	1,618,925.14				
DDIWB-3	East First St.						11006+44.95	631,071.37	1,618,925.14	11006+97.64	631,070.83	1,618,977.83	11007+48.21	631,045.49	1,619,024.03				
DDIWB2	East First St.	11007+81.98	631,029.24	1,619,053.64															
DDIWB-4	East First St.						11008+49.70	630,996.67	1,619,113.01	11009+23.52	630,961.15	1,619,177.73	11009+91.68	630,973.96	1,619,250.44				
DDIWB-5	East First St.						11009+91.68	630,973.96	1,619,250.44	11010+16.98	630,978.34	1,619,275.36	11010+42.04	630,976.69	1,619,300.60				
DDIWB-6	East First St.						11012+86.98	630,960.66	1,619,545.02	11013+12.33	630,959.00	1,619,570.32	11013+37.44	630,951.36	1,619,594.49				
DDIWB-7	East First St.						11013+37.44	630,951.36	1,619,594.49	11014+11.37	630,929.11	1,619,664.99	11014+79.62	630,955.90	1,619,733.90				
DDIWB3	East First St.	11014+92.61	630,960.60	1,619,746.01															
DDIWB-8	East First St.						11015+82.32	630,993.11	1,619,829.62	11016+20.53	631,006.96	1,619,865.23	11016+57.83	631,006.71	1,619,903.45				
DDIWB4	East First St.	11019+90.26	631,004.46	1,620,235.86															
CREEK1	Creekview	99+91.93	630,037.26	1,620,434.96			102+88.47	630,333.80	1,620,436.31	104+08.31	630,453.64	1,620,436.85	105+19.40	630,548.66	1,620,363.82				
CREEKVIEW-1	Creekview						105+19.40	630,548.66	1,620,363.82	106+39.58	630,643.95	1,620,290.59	107+50.93	630,764.13	1,620,291.34				
CREEKVIEW-2	Creekview																		
CREEK2	Creekview	109+74.73	630,987.94	1,620,292.74															
FRISK1	Frisk	400+00.00	630,796.34	1,621,165.61															
FRISK2	Frisk	401+89.37	630,985.70	1,621,163.85															
FRISK3	Frisk	408+19.19	631,615.51	1,621,167.43															
Point RAMP A01	RAMP A_Oralabor	2166+24.73	620,461.10	1,619,100.12															
Curve RAMP A0-1	RAMP A_Oralabor						2173+23.43	621,110.14	1,619,358.82	2176+08.34	621,374.80	1,619,464.31	2178+87.59	621,659.53	1,619,474.19				
Point RAMP A02	RAMP A_Oralabor	2189+08.42	622,679.75	1,619,509.57															

**SPIRAL OR CIRCULAR CURVE DATA**

101-17  
04-19-11

Name	Location	Δ <sub>SCS</sub>	Horizontal Alignment Data													Remarks			
			Spiral Data								Curve Data								
			θ <sub>s</sub>	L <sub>s</sub>	T <sub>s</sub>	E <sub>s</sub>	X <sub>c</sub>	Y <sub>c</sub>	L.T.	S.T.	Δ <sub>c</sub>	T	L	R	E				
I35-1	Interstate 35													3° 13' 01.83"	477.40	954.56	17,000.00	6.70	
I35-2	Interstate 35													1° 41' 06.61"	250.02	500.00	17,000.00	1.84	
I35-3B	Interstate 35	24° 53' 19.19"	4° 08' 56.42"	420.00'	850.48'	72.37'	419.78'	10.13'	280.08'	140.07'									
I35-3	Interstate 35													16° 35' 27.42"	422.83	839.74	2,900.00	30.66	
I35-3A	Interstate 35	24° 53' 19.19"	4° 08' 55.35"	420.00'	850.48'	72.37'	419.75'	10.13'	280.06'	140.06'									
I35-4B	Interstate 35	26° 22' 18.20"	2° 45' 26.49"	385.00'	1,130.00'	109.90'	384.91'	6.18'	256.70'	128.36'									
I35-4	Interstate 35													20° 51' 25.73"	736.20	1,456.10	4,000.00	67.18	
I35-4A	Interstate 35	26° 22' 18.20"	2° 45' 26.49"	385.00'	1,130.00'	109.90'	384.91'	6.18'	256.70'	128.36'									
I35-5	Interstate 35													5° 23' 25.77"	564.91	1,128.57	12,000.00	13.28	
RAMPA-1	RAMP A													11° 15' 06.46"	344.78	687.33	3,500.00	16.94	
RAMPA2-1	RAMP A													59° 07' 44.82"	141.82	258.00	250.00	37.42	
RAMPA3-1	RAMP A													95° 32' 03.96"	165.24	250.11	150.00	73.17	
RAMPB-1	RAMP B													6° 31' 54.19"	285.31	570.00	5,000.00	8.13	
RAMPB-2	RAMP B													4° 14' 27.73"	166.62	333.09	4,500.00	3.08	
RAMPB2-1	RAMP B													60° 24' 42.70"	145.54	263.60	250.00	39.28	
RAMPB3-1	RAMP B													90° 31' 26.39"	186.70	292.29	185.00	77.73	
RAMPC-1	RAMP C													11° 59' 59.66"	367+86	733.03	3,500.00	19.28	
RAMPC2-1	RAMP C													106° 37' 44.39"	201.35	279.15	150.00	101.08	
RAMPC3-1	RAMP C													76° 44' 14.87"	277.10	468.76	350.00	96.41	
RAMPD-1	RAMP D													8° 01' 17.07"	140.23	280.00	2,000.00	4.91	
RAMPD2-1	RAMP D													108° 41' 54.99"	209.13	284.57	150.00	107.36	
RAMPD3-1	RAMP D													74° 40' 04.27"	228.82	390.96	300.00	77.30	
FIRST_OR-1	East First St.													4° 38' 46.64"	13.12	26.23	323.50	0.27	
FIRST_OR-2	East First St.													8° 01' 02.32"	14.02	27.99	200.00	0.49	
FIRST_OR-3	East First St.													9° 03' 36.03"	15.85	31.63	200.00	0.63	
FIRST_OR-4	East First St.													5° 39' 12.89"	14.81	29.60	300.00	0.37	
FIRST_OR-5	East First St.													6° 13' 19.50"	44.57	89.05	820.00	1.21	
FIRST_OR-6	East First St.													6° 13' 19.50"	44.62	89.16	821.00	1.21	
FIRST_OR-7	East First St.													8° 24' 44.57"	60.38	120.54	821.00	2.21	
FIRST_OR-8	East First St.													8° 24' 44.57"	60.38	120.54	821.00	2.21	
DDIEB-1	East First St.													21° 38' 00.74"	40.12	79.29	210.00	3.73	
DDIEB-2	East First St.													36° 10' 18.60"	68.58	132.58	210.00	10.92	
DDIEB-3	East First St.													11° 10' 18.60"	20.54	40.95	210.00	1.00	
DDIEB-4	East First St.													13° 44' 21.95"	25.30	50.36	210.00	1.52	
DDIEB-5	East First St.													38° 44' 21.95"	73.83	141.99	210.00	12.60	
DDIEB-6	East First St.													53° 56' 21.18"	106.86	197.70	210.00	25.62	
DDIEB-7	East First St.													25° 34' 21.93"	47.66	93.73	210.00	5.34	
DDIWB-1	East First St.													24° 48' 30.22"	65.98	129.90	300.00	7.17	
DDIWB-2	East First St.													25° 00' 08.53"	46.56	91.64	210.00	5.10	
DDIWB-3	East First St.													28° 10' 20.96"	52.69	103.26	210.00	6.51	
DDIWB-4	East First St.													38° 44' 21.95"	73.83	141.99	210.00	12.60	
DDIWB-5	East First St.													13° 44' 21.95"	25.3	50.36	210.00	1.52	
DDIWB-6	East First St.													13° 46' 05.65"	25.35	50.46	210.00	1.53	
DDIWB-7	East First St.													38° 46' 02.24"	73.93	142.17	210.00	12.63	
DDIWB-8	East First St.													21° 38' 00.74"	38.21	75.52	200.00	3.62	
CREEKVIEW-1	Creekview													37° 48' 11.34"	119.84	230.93	350.00	19.95	
CREEKVIEW-2	Creekview													37° 54' 06.11"	120.18	231.53	350.00	20.06	
RAMPA-0	RAMP A - Oralabor													19° 44' 44.95"	284.90	564.16	1,637.00	24.61	



**CROSS SECTION VIEW COLOR LEGEND  
OF TRAFFIC CONTROL AND STAGING SHEETS**

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Med	(237)	Future Proposed Pavement Shading

**CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND  
OF TRAFFIC CONTROL AND STAGING SHEETS**

	Pavement Removal		Proposed Granular Shoulder
	Proposed Granular Subbase		Temporary Shoulder
	Proposed Special Backfill		Existing Shoulder Strengthening
	Temporary Barrier Rail		Permanent Barrier Rail
			Channelizing Device

**PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS**

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Magenta	(5)	Pavement Marking Call Outs
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Yellow	(4)	Pavement Markings, Yellow
Off White	(254)	Pavement Markings, White

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Proposed Granular Surface Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Light	(236)	Proposed Grading Limits Shading
Pink, Dark	(13)	Proposed MSE or CIP Wall Shading
Red	(3)	Proposed Bridge Shading and Sign Trusses
Black w/Gray, Light Fill	(0,48)	Previously Constructed Structure

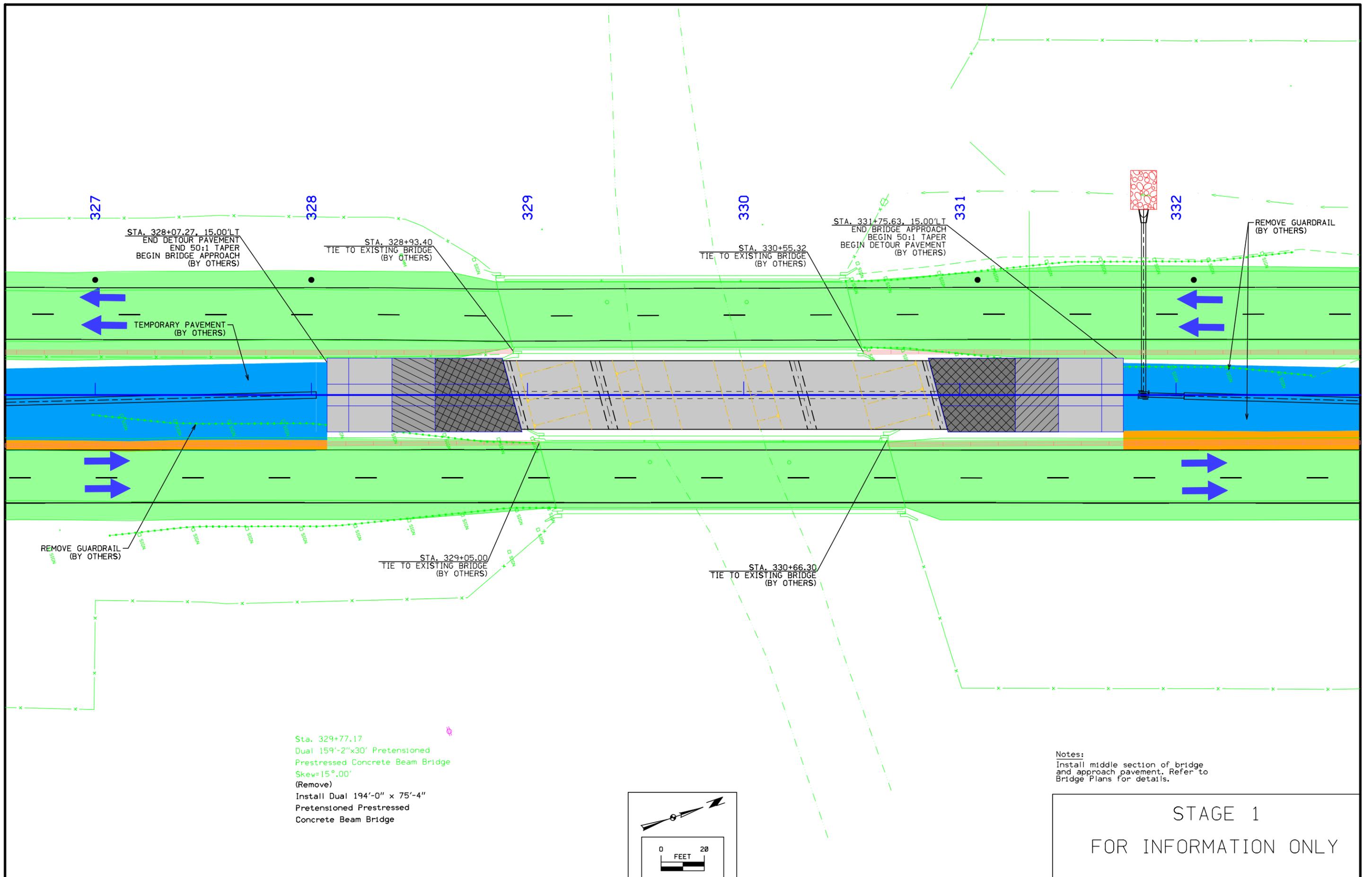
**PLAN VIEW PATTERN AND SYMBOL LEGEND  
OF TRAFFIC CONTROL AND STAGING SHEETS**

●	Channelizing Device	■	Crash Cushion
✕	Drum	⊙→	Traffic Signal
■	Temporary Lane Separator	⊠	Flagger
◆	Tubular Marker	⊙⊙	Temporary Floodlighting
♦	Channelizer Marker	⊠	Traffic Sign
△	Concrete Barrier Marker	⊠	Type III Barricade
↵	Delineator	☀	Type A Warning Light
≡	Temporary Barrier Rail	←	Direction of Traffic
		⌒	Safety Closure

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

**TRAFFIC CONTROL  
AND  
STAGING  
LEGEND AND SYMBOL  
INFORMATION SHEET**

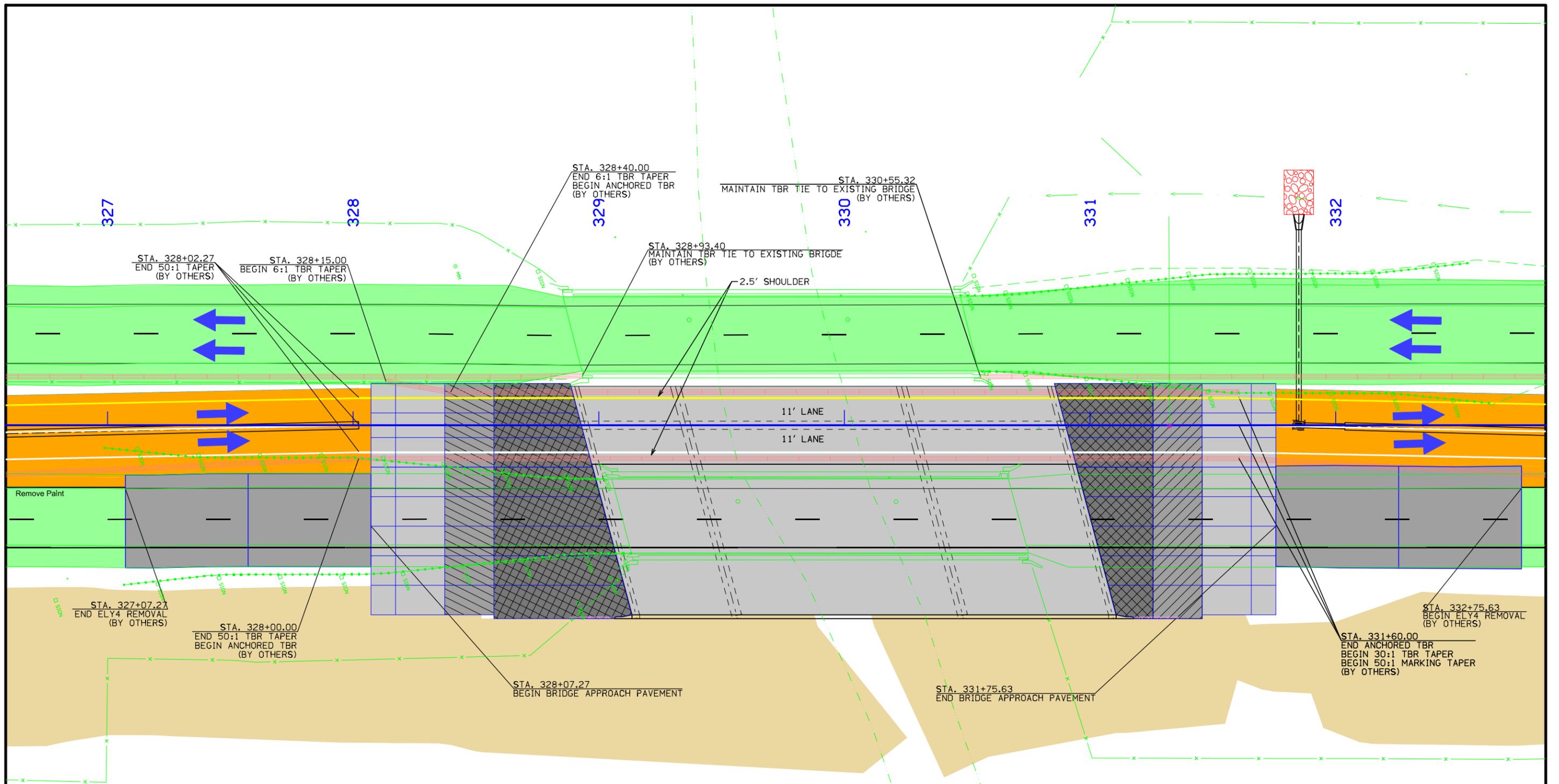
(COVERS SHEET SERIES J)



Sta. 329+77.17  
 Dual 159'-2"x30' Prestensioned  
 Prestressed Concrete Beam Bridge  
 Skew=15°.00'  
 (Remove)  
 Install Dual 194'-0" x 75'-4"  
 Prestensioned Prestressed  
 Concrete Beam Bridge

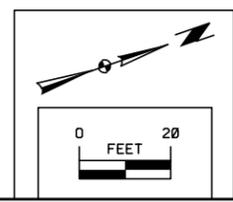
Notes:  
 Install middle section of bridge  
 and approach pavement. Refer to  
 Bridge Plans for details.

STAGE 1  
 FOR INFORMATION ONLY

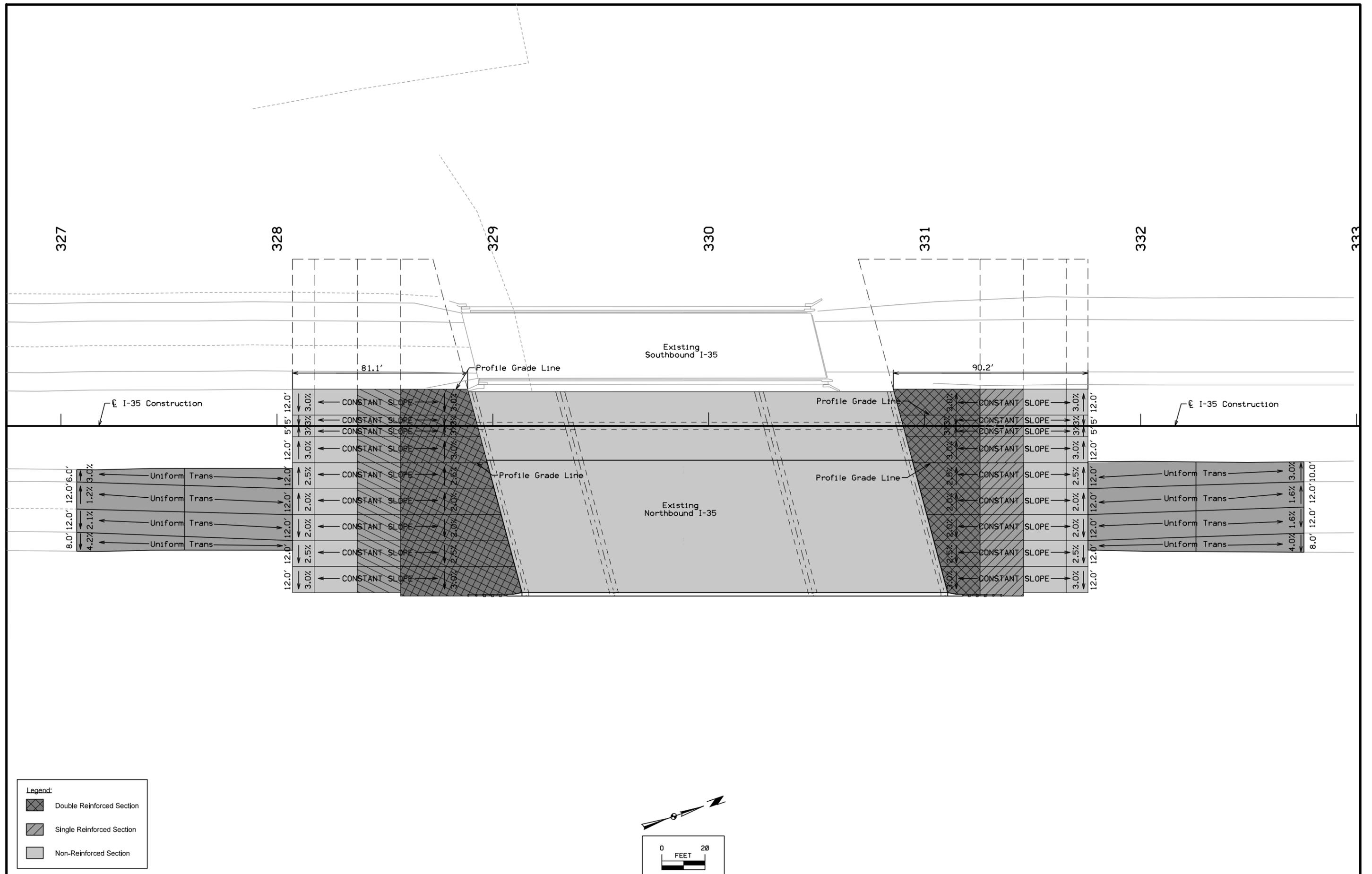


Sta. 329+77.17  
 Dual 159'-2"x30' Pretensioned  
 Prestressed Concrete Beam Bridge  
 Skew=15°.00'  
 (Remove)  
 Install Dual 194'-0" x 75'-4"  
 Pretensioned Prestressed  
 Concrete Beam Bridge

NOTES  
 INSTALL REMAINING NORTHBOUND BRIDGE AND  
 BRIDGE APPROACH PAVEMENT AND SURFACE  
 OVERLAY. REFER TO BRIDGE PLANS FOR DETAILS.

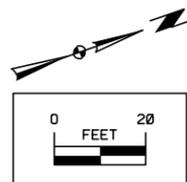


STAGE 2  
 FOR INFORMATION ONLY



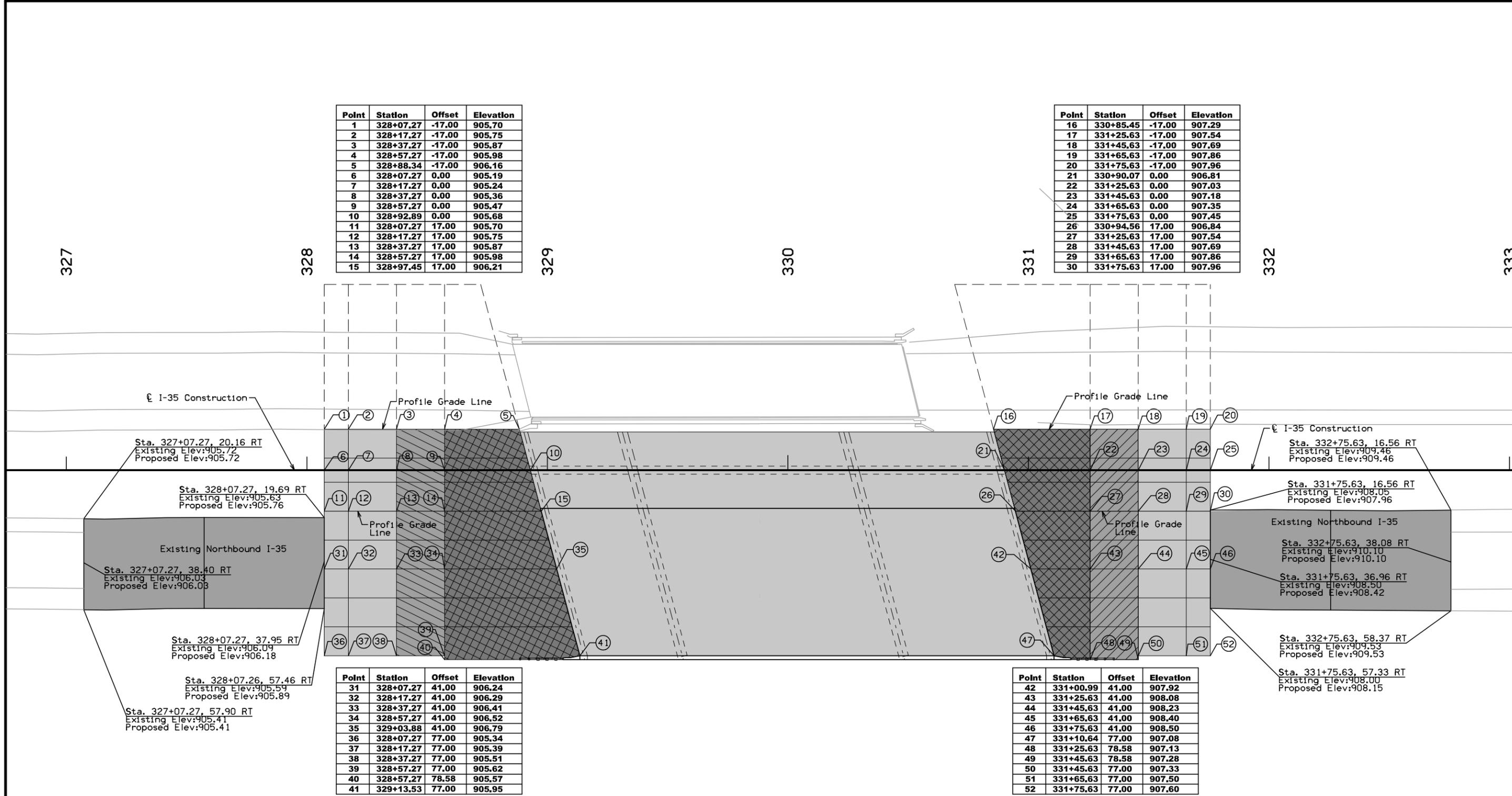
Legend:

	Double Reinforced Section
	Single Reinforced Section
	Non-Reinforced Section



Point	Station	Offset	Elevation
1	328+07.27	-17.00	905.70
2	328+17.27	-17.00	905.75
3	328+37.27	-17.00	905.87
4	328+57.27	-17.00	905.98
5	328+88.34	-17.00	906.16
6	328+07.27	0.00	905.19
7	328+17.27	0.00	905.24
8	328+37.27	0.00	905.36
9	328+57.27	0.00	905.47
10	328+92.89	0.00	905.68
11	328+07.27	17.00	905.70
12	328+17.27	17.00	905.75
13	328+37.27	17.00	905.87
14	328+57.27	17.00	905.98
15	328+97.45	17.00	906.21

Point	Station	Offset	Elevation
16	330+85.45	-17.00	907.29
17	331+25.63	-17.00	907.54
18	331+45.63	-17.00	907.69
19	331+65.63	-17.00	907.86
20	331+75.63	-17.00	907.96
21	330+90.07	0.00	906.81
22	331+25.63	0.00	907.03
23	331+45.63	0.00	907.18
24	331+65.63	0.00	907.35
25	331+75.63	0.00	907.45
26	330+94.56	17.00	906.84
27	331+25.63	17.00	907.54
28	331+45.63	17.00	907.69
29	331+65.63	17.00	907.86
30	331+75.63	17.00	907.96

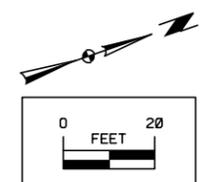


Point	Station	Offset	Elevation
31	328+07.27	41.00	906.24
32	328+17.27	41.00	906.29
33	328+37.27	41.00	906.41
34	328+57.27	41.00	906.52
35	329+03.88	41.00	906.79
36	328+07.27	77.00	905.34
37	328+17.27	77.00	905.39
38	328+37.27	77.00	905.51
39	328+57.27	77.00	905.62
40	328+57.27	78.58	905.57
41	329+13.53	77.00	905.95

Point	Station	Offset	Elevation
42	331+00.99	41.00	907.92
43	331+25.63	41.00	908.08
44	331+45.63	41.00	908.23
45	331+65.63	41.00	908.40
46	331+75.63	41.00	908.50
47	331+10.64	77.00	907.08
48	331+25.63	78.58	907.13
49	331+45.63	78.58	907.28
50	331+45.63	77.00	907.33
51	331+65.63	77.00	907.50
52	331+75.63	77.00	907.60

Legend:

- Double Reinforced Section
- Single Reinforced Section
- Non-Reinforced Section



328

329

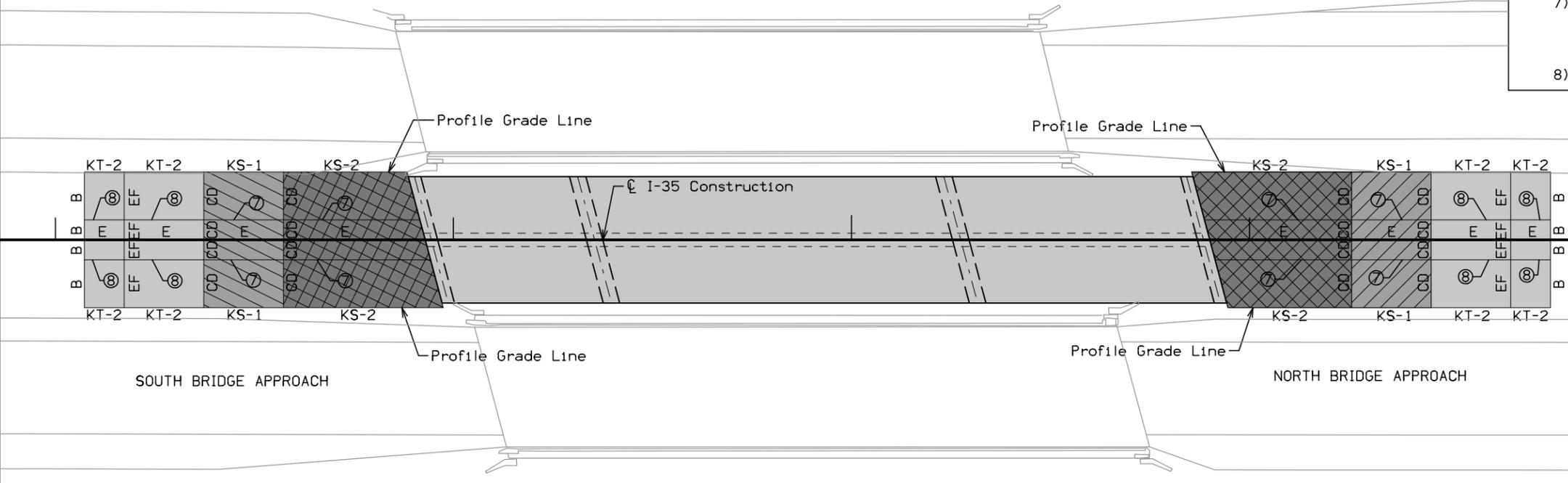
330

331

- NOTES:
- 1) Use a 1" 'E' Joint down centerline of Median.
  - 2) Use a 'KS-2' Joint on the longitudinal edge of the double reinforced sections.
  - 3) Use a 'KS-1' Joint on the longitudinal edge of the single reinforced sections.
  - 4) Use a 'Kt-2' Joint on the longitudinal edge of the non-reinforced sections.
  - 5) For all other joints, refer to BR-203 and BR-213 Standard Road Plans.
  - 6) Refer to Standard Road Plan PV-101 for joint details.
  - 7) Longitudinal joint
    - A) Single Pour: Sawcut per PV-101, Detail B.
    - B) Two Pours:
      - Use 'KS-1' joint for single reinforced section
      - Use 'KS-2' joint for double reinforced section
  - 8) Use 'KT-2' or 'L-2' joint for non-reinforced section

**LEGEND**

-  Double Reinforced Section
-  Single Reinforced Section
-  Non-Reinforced Section



JOINTING LAYOUT  
STAGE 1

328

329

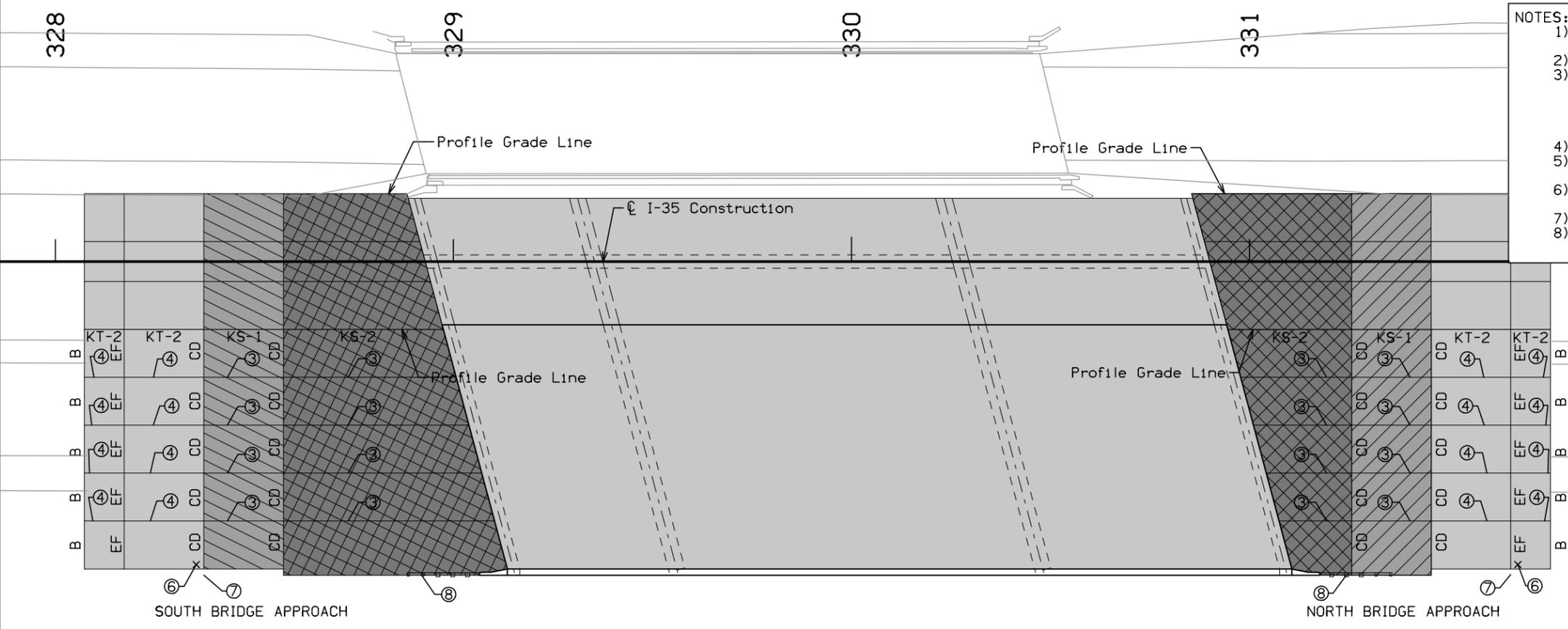
330

331

- NOTES:
- 1) For jointing, refer to Standard Road Plans BR-203 and BR-213
  - 2) Refer to Standard Road Plan PV-101 for joint details.
  - 3) Longitudinal joint
    - A) Single Pour: Sawcut per PV-101, Detail B.
    - B) Two Pours:
      - Use 'KS-1' joint for single reinforced section
      - Use 'KS-2' joint for double reinforced section
  - 4) Use 'KT-2' or 'L-2' joint for non-reinforced section
  - 5) Polymer grid and excavation limits of subbase 2-foot outside edge of pavement. See BR-203.
  - 6) Place an "X" in the plastic concrete near the 'EF' joint at the outside edge of pavement.
  - 7) Slope subdrain to drain. See DR-304 for outlet details.
  - 8) Build 4 inch sloped curb to end of double reinforced section.

**LEGEND**

-  Double Reinforced Section
-  Single Reinforced Section
-  Non-Reinforced Section



JOINTING LAYOUT  
STAGE 2