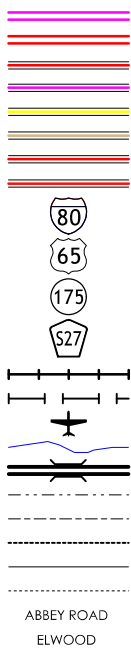


BRIDGE NEW - CCS
ER-002-I(136)--28-36
7/21/2020

FREMONT COUNTY - DESIGN 620 & 720

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

PRIMARY ROAD SYSTEM

FREMONT COUNTY

BRIDGE NEW - CCS

1A 2 EB/WB OVER MISSOURI RIVER OVERFLOW
1.6 MILES WEST OF I-29

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.

ENGLISH STANDARD
BRIDGE PLANS

STANDARD ISSUED REVISED

TOTAL SHEETS
61

PROJECT NUMBER

ER-002-I(136)--28-36

R.O.W. PROJECT NUMBER

PROJECT IDENTIFICATION NUMBER

19-36-002-070-01

INDEX OF SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 620
2-25	DESIGN 620
26	ESTIMATE SHEET - DESIGN 720
26-49	DESIGN 720
SPS.1-SPS.4	SOIL PROFILE SHEET
C.1	ESTIMATE SHEET FOR ROADWAY
C.1-U.6	ROADWAY SHEETS

REVISIONS



1-800-292-8989

www.iowaonecall.com



STANDARD ROAD
PLANS

STANDARD ROAD PLANS ARE LISTED
ON SHEET NUMBER C.1

DESIGN DATA RURAL

REFER TO INDIVIDUAL
SITUATION PLANS FOR
TRAFFIC DATA INFORMATION

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	ANTHONY J. BOWER	STRUCTURAL DESIGN
5 & 29	ANDREW W. MCCOY	HYDRAULIC DESIGN
SPS.1	JUSTIN D. HUMKE	GEOTECHNICAL DESIGN
C.1	KELLY C. BELL	ROADWAY DESIGN

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 Anthony J. Bower Date 5/14/2020
Printed or Typed Name Anthony J. Bower

My license renewal date is December 31, 2020

Pages or sheets covered by this seal: SHEETS 1 THRU 49

PROJECT DIRECTORY NAME: 3600207019

DESIGN TEAM Stanley Consultants Inc.

ENGLISH IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES

FILE NO. 31911

FREMONT COUNTY

PROJECT NUMBER ER-002-I(136)--28-36

SHEET NUMBER 1

ESTIMATED BRIDGE QUANTITIES - DESIGN 720					
ITEM NO.	ITEM CODE	ITEM	UNIT	QUANTITY	AS BUILT QUANTITY
1.	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	8600	
2.	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3.	2402-2720000	EXCAVATION, CLASS 20	CY	1646	
4.	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	273.9	
5.	2403-7000210	HIGH PERFORMANCE STRUCTURAL CONCRETE	CY	700.7	
6.	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	188558	
7.	2404-7775009	REINFORCING STEEL, STAINLESS STEEL	LB	4607	
8.	2405-2705000	EXCAVATE AND DEWATER	LS	1.00	
9.	2414-6424110	CONCRETE BARRIER RAILING	LF	440	
10.	2501-0201057	PILES, STEEL, HP 10x57	LF	6015	
11.	2501-6335010	PREBORED HOLES	LF	180	
12.	2507-2638650	BRIDGE WING ARMORING - EROSION STONE	SY	12.0	
13.	2507-3250005	ENGINEERING FABRIC	SY	2550	
14.	2507-6800061	REVETMENT, CLASS E	TON	2250	
15.	2507-8029000	EROSION STONE	TON	13.2	
16.	2526-8285000	CONSTRUCTION SURVEY	LS	1.00	
17.	2533-4980005	MOBILIZATION	LS	1.00	

ITEM NO.	DESCRIPTION
12.	INCLUDES FURNISHING AND PLACING ENGINEERING FABRIC, EROSION STONE, AND ALL REQUIRED EXCAVATING, SHAPING AND COMPACTING FOR WING ARMORING.
13.	ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR REVETMENT, ARTICLE 4196.01,B,6 AND EMBANKMENT EROSION CONTROL, ARTICLE 4196.01,B,3 OF THE STANDARD SPECIFICATIONS.
14.	ESTIMATED AT 1.6 TON/CY. BROKEN CONCRETE WILL NOT BE ALLOWED AS A SUBSTITUTE FOR REVETMENT.
15.	ESTIMATED AT 1.6 TON/CY.

ESTIMATE REFERENCE INFORMATION

ROADWAY QUANTITIES
SHOWN ON SHEET C.1

ITEM NO.	DESCRIPTION
1.	INCLUDES EXCAVATION FOR CHANNEL WITHIN THE APPROXIMATE LIMITS OF AREAS AS SHOWN ON THE "SITUATION PLAN" NORTH OF ½ IA 2.
2.	INCLUDES ALL WORK FOR PARTIAL REMOVAL AND OFF-SITE DISPOSAL OF THE EXISTING RCB AS SHOWN ON DESIGN SHEET 4. REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO MATERIAL NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE. INCLUDES ANY SHEET PILING REQUIRED TO PROTECT PIERS OR REDIRECT RCB FLOW. INCLUDES REMOVING ALL TEMPORARY SHORING REQUIRED FOR CONSTRUCTION OF EASTBOUND BRIDGE.
3.	INCLUDES EXCAVATION FOR BRIDGE ABUTMENTS, WINGS, AND REVETMENT. QUANTITY FOR "EXCAVATION, CLASS 20" IS BASED ON THE ASSUMPTION THAT SITE GRADING AND SHAPING HAS BEEN COMPLETED TO THE "PROPOSED GROUND LINE" PRIOR TO THE START OF CONSTRUCTION OF THE ABUTMENT, WINGS, AND REVETMENT.
4.	INCLUDES THE CONCRETE FOR THE ABUTMENT FOOTINGS AND PIER ENCASEMENTS. INCLUDES FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), FLOODABLE BACKFILL, POROUS BACKFILL, GEOTEXTILE FABRIC, WATER FLOODING, AND SUBDRAIN OUTLETS AT ABUTMENTS. INCLUDES FURNISHING AND PLACING 3 INCH DIAMETER PVC PLASTIC PIPE AND EXPANDING FOAM IN THE ABUTMENT WINGS.
5.	THE BID ITEM INCLUDES THE CONCRETE FOR THE SLAB, ABUTMENT END DIAPHRAGMS, ABUTMENT WINGS, AND MONOLITHIC PIER CAPS. REFER TO THE DEVELOPMENTAL SPECIFICATION FOR HIGH PERFORMANCE CONCRETE FOR STRUCTURES FOR ADDITIONAL INFORMATION. INCLUDES COST OF 12 DRAINS AT 48 LBS STEEL PER DRAIN.
8.	FOR PIERS IN ACCORDANCE WITH ARTICLE 2405 OF THE STANDARD SPECIFICATIONS. PAYMENT IS FOR FULL COMPENSATION FOR CLASS 20 AND CLASS 21 EXCAVATION, COFFERDAMS, COSTS OF OTHER PROCEDURES REQUIRED TO DEWATER THE EXCAVATIONS, PUMPING, BAILING AND DRAINAGE, AND MATERIALS, WORK, LABOR, AND EQUIPMENT REQUIRED TO PLACE THE PIERS IN THE DRY.
9.	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 CONCRETE. INCLUDES 440 FEET OF 2 INCH DIAMETER RIGID STEEL CONDUIT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS.
10.	INCLUDES FURNISHING AND INSTALLING STEEL PILE POINTS. PILING SHALL BE GRADE 50. SPLICES BETWEEN INDIVIDUAL LENGTHS OF PILE SHALL CONSIST OF FULL PENETRATION WELDS IN ACCORDANCE WITH SECTION 2501.03,P,2 OF THE STANDARD SPECIFICATIONS.

DESIGN FOR 0° SKEW

209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS59'-0 INTERIOR SPANS

ESTIMATED QUANTITIES

IA 2 STA. 1457+54.50, LT. 32.00'MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 24FILE NO. 31911DESIGN NO. 720

SUMMARY OF CONCRETE QUANTITIES

	LOCATION	STRUCTURAL CONCRETE	HPC STRUCTURAL CONCRETE
**	WEST ABUT. FTG.	14.4	
	EAST ABUT. FTG.	14.4	
	SUPERSTRUCTURE		700.7
	PIER ENCASEMENTS 3 @ 81.7	245.1	
	TOTAL (CU. YDS.)	273.9	700.7

** INCLUDES BRIDGE SLAB, ABUTMENT DIAPHRAGMS, ABUTMENT WINGS, & MONOLITHIC PIER CAPS

SUMMARY OF REINFORCING STEEL

LOCATION	NON-COATED REINFORCING STEEL	STAINLESS STEEL REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
WEST ABUT. FTG.			2,130
EAST ABUT. FTG.			2,130
BRIDGE SLAB		223	159,772
BARRIER RAIL - NORTH RAIL		1,808	3,308
BARRIER RAIL - SOUTH RAIL		1,808	3,308
BARRIER RAIL END SECTION		768	1,064
PIER ENCASEMENTS 3 @ 5579			16,737
CONDUIT SUPPORT BARS - NORTH RAIL			109
TOTAL (LBS.)		4,607	188,558

SUMMARY OF EXCAVATION

LOCATION	CLASS 20 EXCAVATION	CLASS 10 EXCAVATION
WEST ABUTMENT	48	
EAST ABUTMENT	48	
PIERS ***		
REVETMENT ARMORING	1550	
CHANNEL		8,600
TOTAL (CU. YDS.)	1646	8,600

*** EXCAVATION FOR PIERS INCLUDED WITH PRICE BID
FOR "EXCAVATE AND DEWATER"

SUMMARY OF FOUNDATIONS

[illegible]

DESIGN FOR 0° SKEW

209'-0" X 40'-0" CONTINUOUS
CONCRETE SLAB W.B. BRIDGE

45'-6" END SPANS 59'-0" INTERIOR SPANS

SUMMARY QUANTITIES SHEET

1A 2 STA. 1457+54.50, LT. 32.00' MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 24 FILE NO. 31911 DESIGN NO. 720

GENERAL NOTES:

THIS DESIGN IS TO CONSTRUCT A NEW 4-SPAN 209'-0" X 40'-0" CONCRETE SLAB BRIDGE ON WESTBOUND IA 2 OVER THE MISSOURI RIVER OVERFLOW.

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

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

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

THE BRIDGE CONTRACTOR SHALL PREBORE HOLES FOR ABUTMENT PILES. HOLES SHALL BE BORED TO THE ELEVATIONS SHOWN ON THE "LONGITUDINAL SECTION ALONG CENTERLINE W.B. IA 2" ON SITUATION PLAN SHEET. PILES SHALL BE DRIVEN THROUGH THE HOLES TO AT LEAST THE SPECIFIED DESIGN BEARING.

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.

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

CONCRETE BARRIER RAILS PLACED USING THE SLIP FORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03A,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 SIPHONED METHOD).

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5G1 IS 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.

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.

LONGITUDINAL GROOVING WILL BE INCLUDED WITH THE ROADWAY PLANS.

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

GUARDRAIL IS TO BE PLACED BY OTHERS.

CAST IN-ONE-PIECE STEEL PILE POINTS ARE REQUIRED FOR ABUTMENT AND PIER PILES IN ACCORDANCE WITH ARTICLE 4167.02 OF THE CURRENT STANDARD SPECIFICATIONS AND MATERIALS IM. 468.

IA.2 WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN THIS SHEET.

NO WAITING TIME REQUIRED BETWEEN COMPLETION OF ABUTMENT FILL AND DRIVING PILES.

SUBDRAIN SLOPED DOWNWARD 2% PER FOOT FROM CENTERLINE APPROACH ROADWAY TO EXTEND THRU FILL (TYPICAL BOTH ABUTMENTS).

THE BRIDGE CONTRACTOR IS TO CLEAR AND/OR SHAPE THE CHANNEL WITHIN THE APPROXIMATE LIMITS OF THE AREAS AS SHOWN ON THE "SITUATION PLAN" AND "LONGITUDINAL SECTION ALONG CENTERLINE W.B. IA 2" ON DESIGN SHEET 4.

THE BID ITEM "REMOVALS, AS PER PLAN" SHALL INCLUDE ALL COSTS ASSOCIATED WITH PARTIALLY REMOVING THE EXISTING RCB AND REMOVING TEMPORARY SHORING REQUIRED FOR EASTBOUND BRIDGE CONSTRUCTION. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL MAINTAIN TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF MAINTAINING SHORING, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

SPECIFICATIONS:

DESIGN: AASHTO LRFD 8th Ed, SERIES OF 2017, 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.

DEVELOPMENTAL SPECIFICATIONS FOR HIGH PERFORMANCE CONCRETE.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th Ed, SERIES OF 2017, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60 FOR EPOXY COATED AND NON-COATED, AND GRADE 60 OR 75 FOR STAINLESS.

CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI. STRUCTURAL STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 6. ASTM A709 GRADE 36, GRADE 50, AND GRADE 50W (AASHTO M270 GRADE 36, GRADE 50, AND GRADE 50W).

BRIDGE SLAB DIMENSIONS TABLE

NO.	ITEM	UNIT	QUANTITY
1	SLAB LENGTH	L.F.	209.8
2	MINIMUM SLAB WIDTH	L.F.	43.2
3	MAXIMUM SLAB WIDTH	L.F.	43.2
4	SLAB AREA	S.F.	9063

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

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.

SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION:
(Paren)_County_DesignNumber_SubmittalDescription.pdf
Example: (090)_BlackHawk_Design915_DeckDrains.pdf

1	FLOOR DRAINS
2	FALSEWORK

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN INCLUDED IN THE TIED ROAD PLANS, PROJECT NO. ER -002-1(130)-28-36.

NOTE:
ROAD PLANS FOR THE PROJECT HAVE BEEN TIED TO THE BRIDGE PLANS THROUGH THE CONTRACT LETTING PROCESS. THE TIED ROAD PLANS, PROJECT NO. ER-002-1(130)--28-36, CONTAIN 404 PERMIT INFORMATION AND THE POLLUTION PREVENTION PLAN.

DESIGN FOR 0° SKEW

209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS59'-0 INTERIOR SPANS

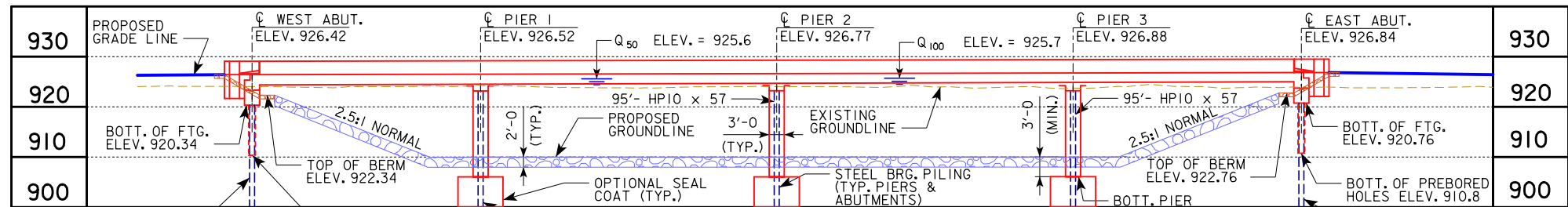
GENERAL NOTES

IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 24 FILE NO. 31911 DESIGN NO. 720



BENCH MARK: SEE 'G' SHEETS WITHIN
TIED PROJECT ER-002-1(130)--28-36

VPI STA. = 1456+40
VPI ELEV. = 926.00
VC = 180'

VPI STA. = 1458+20
VPI ELEV. = 926.90
VC = 180'

PROPOSED PROFILE GRADE IA 2

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.

Andrew W. McCoy

4/23/2020

Signature **ANDREW W. MCCOY** Date

Printed or Typed Name

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: 29

HYDRAULIC DATA

DRAINAGE AREA = 410,000 SQ. MI.
STREAM SLOPE = 1.0 FT./MI.

Q_{50} = 8,583 CFS
STAGE = 925.6
AVG. BRIDGE VELOCITY = 3.0 FPS

Q_{100} = 9,762 CFS
STAGE = 925.7
AVG. BRIDGE VELOCITY = 3.3 FPS

Q_{200} = 10,755 CFS
STAGE = 925.9
CALCULATED DESIGN SCOUR = 877.0
SCOUR MITIGATION WILL CONSIST OF REVETMENT.

Q_{500} = 11,288 CFS
STAGE = 926.1
CALCULATED CHECK SCOUR = 875.5

NOTES:

- ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED.
- TL-4 BRIDGE RAILING PROPOSED. TWO 2" CONDUITS TO BE INCLUDED EMBEDDED IN OUTSIDE BARRIER.
- TOP OF BRIDGE DECK AT \bar{C} W.B. IA 2 IS 0.21' ABOVE THE PROFILE GRADE TO ACCOUNT FOR CROSS SLOPE AND PARABOLIC CROWN.
- PIER TYPE - MONOLITHIC PILE BENTS - FULLY ENCASED.
- CLASS E REVETMENT STONE IS EMBEDDED.
- FIELD VERIFY UTILITY LOCATIONS ALONG NORTH APPARENT ROW LINE.
- NO FLOOR DRAINS REQUIRED NEAR SPAN 4 HIGH POINT, STA. 1458+20.00.

LOCATION

IA 2 OVER MISSOURI RIVER
FLOODPLAIN OVERFLOW
T-68N R-43W
SECTION 30
BENTON TOWNSHIP
FREMONT COUNTY
FHWA NO. 701120
BRIDGE MAINT. NO. 3601.8L002
LATITUDE 40.688522°
LONGITUDE -95.811972°

SITUATION PLAN

UTILITIES LEGEND:

ELECTRIC - ATCHISON-HOLT
FIBER OPTIC - SPIRAL COMMUNICATIONS

TRAFFIC ESTIMATE

2019 AADT 9,860 V.P.D.
TRUCKS 29 %
TOTAL 20 YEAR
DESIGN ESALS 8,360,000

DESIGN FOR 0° SKEW 209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS 59'-0 INTERIOR SPANS

SITUATION PLAN

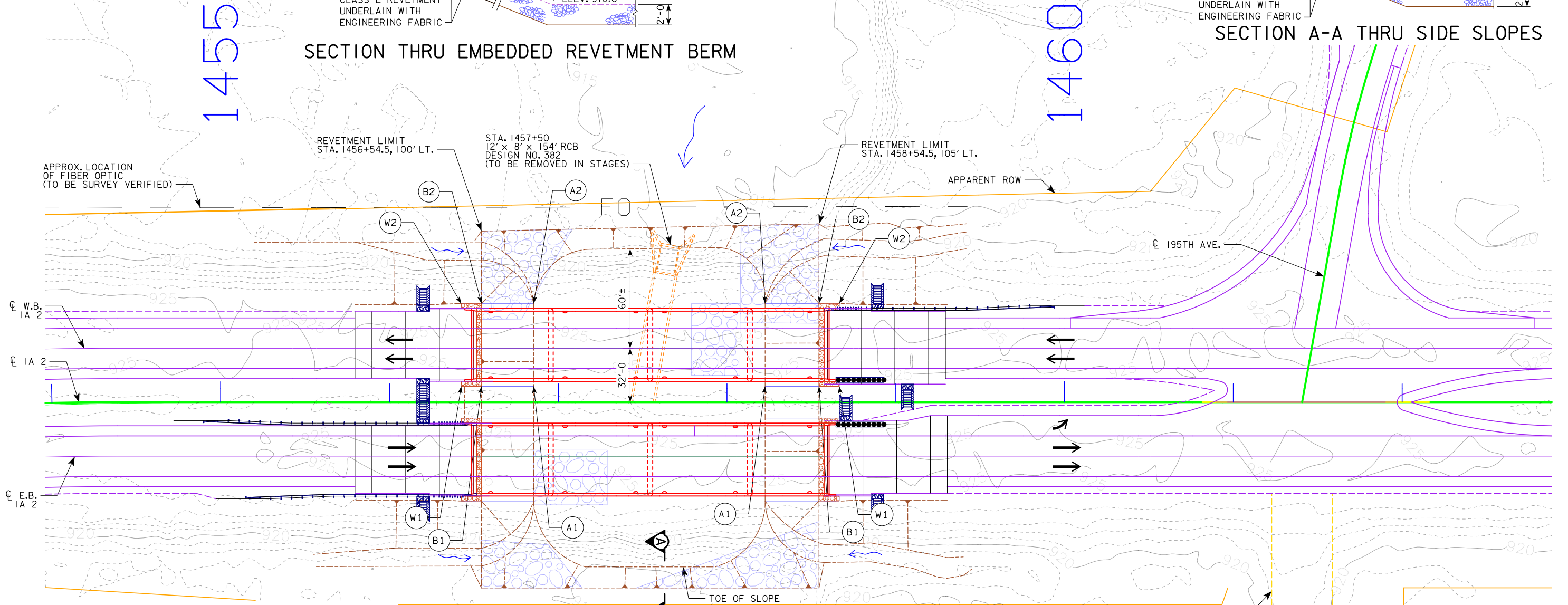
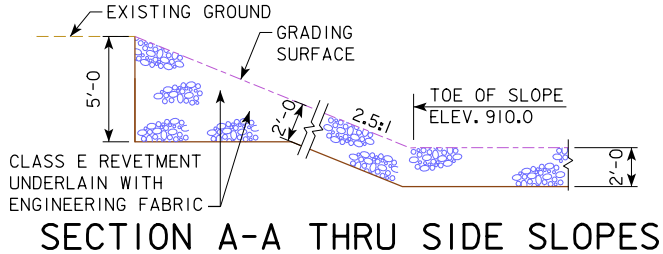
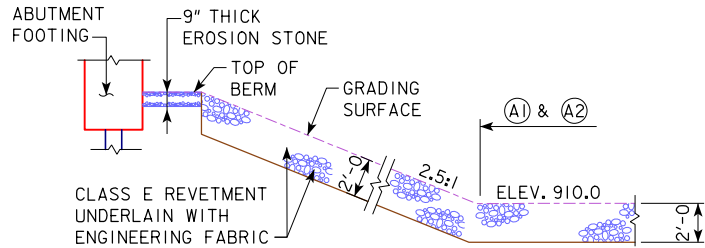
IA 2 STA. 1457+54.50, LT. 32.00'

MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 4 OF 24 FILE NO. 31911 DESIGN NO. 720

BENCH MARK: SEE 'G' SHEETS WITHIN
TIED PROJECT ER-002-I(130)--28-36



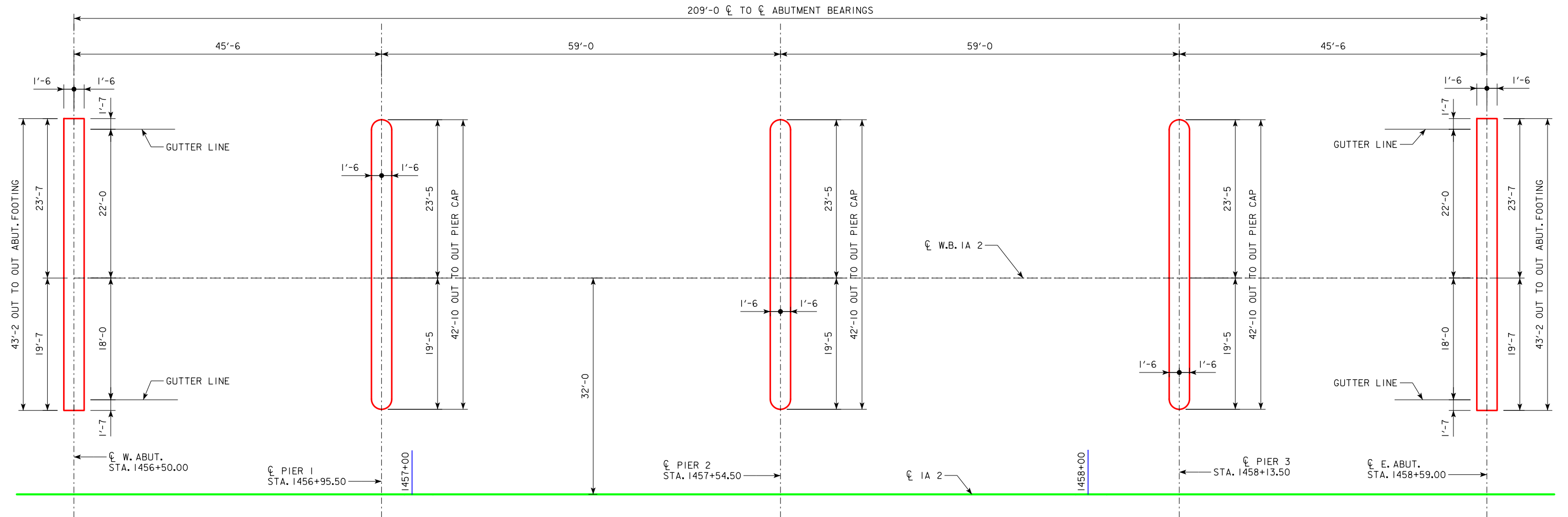
BERM SLOPE LOCATION TABLE						
POINTS	WEST ABUTMENT			EAST ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	1456+85.40	9.4' LT.	910.00	1458+22.60	9.4' LT.	910.00
A2	1456+85.40	58.6' LT.	910.00	1458+22.60	58.6' LT.	910.00
B1	1456+54.50	9.4' LT.	922.30	1458+54.50	9.4' LT.	922.80
B2	1456+54.50	58.6' LT.	922.30	1458+54.50	58.6' LT.	922.80
W1	1456+42.50	9.4' LT.	925.80	1458+66.50	9.4' LT.	926.20
W2	1456+42.50	58.6' LT.	925.60	1458+66.50	58.6' LT.	926.00

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE

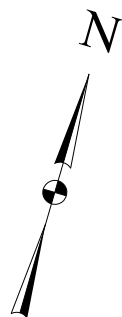
ESTIMATED BERM ARMORING QUANTITIES					
LOCATION	REVTMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. 10 (CY)	EXCAVATION CL. 20 (CY)
BERM LINING - WEST ABUTMENT	1120	6.6	1260	4250	770
BERM LINING - EAST ABUTMENT	1130	6.6	1290	4350	780
TOTALS	2250	13.2	2550	8600	1550

EXCAVATION QUANTITY CALCULATED FROM EXISTING GROUND.
QUANTITIES INCLUDED WITH BRIDGE PLANS.

DESIGN FOR 0° SKEW
**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**
45'-6 END SPANS 59'-0 INTERIOR SPANS
SITUATION PLAN - SITE
IA 2 STA. 1457+54.50, LT. 32.00'
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 24 FILE NO. 31911 DESIGN NO. 720



STAKING DIAGRAM



BRIDGE COORDINATES

LOCATION	W. ABUT. BRG.	PIER 1	PIER 2	PIER 3	E. ABUT. BRG.
NORTH EDGE OF DECK	N=6759770.586 E=16478083.027	N=6759783.228 E=16478126.735	N=6759799.622 E=16478183.412	N=6759816.015 E=16478240.089	N=6759828.657 E=16478283.797
W. APPROACH ROADWAY	N=6759747.931 E=16478089.580	N=6759760.574 E=16478133.288	N=6759776.967 E=16478189.965	N=6759793.360 E=16478246.642	N=6759806.003 E=16478290.350
SOUTH EDGE OF DECK	N=6759729.119 E=16478095.021	N=6759741.762 E=16478138.729	N=6759758.155 E=16478195.406	N=6759774.548 E=16478252.083	N=6759787.190 E=16478295.791

NOTE: AN ELECTRONIC FILE CONTAINING THE BRIDGE COORDINATE DATA IS AVAILABLE AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL VERIFY THESE COORDINATES WITH THE PROJECT HORIZONTAL CONTROL INFORMATION PROVIDED IN THE ROAD PLANS.

DESIGN FOR 0° SKEW

**209'-0" X 40'-0" CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**

45'-6" END SPANS 59'-0" INTERIOR SPANS

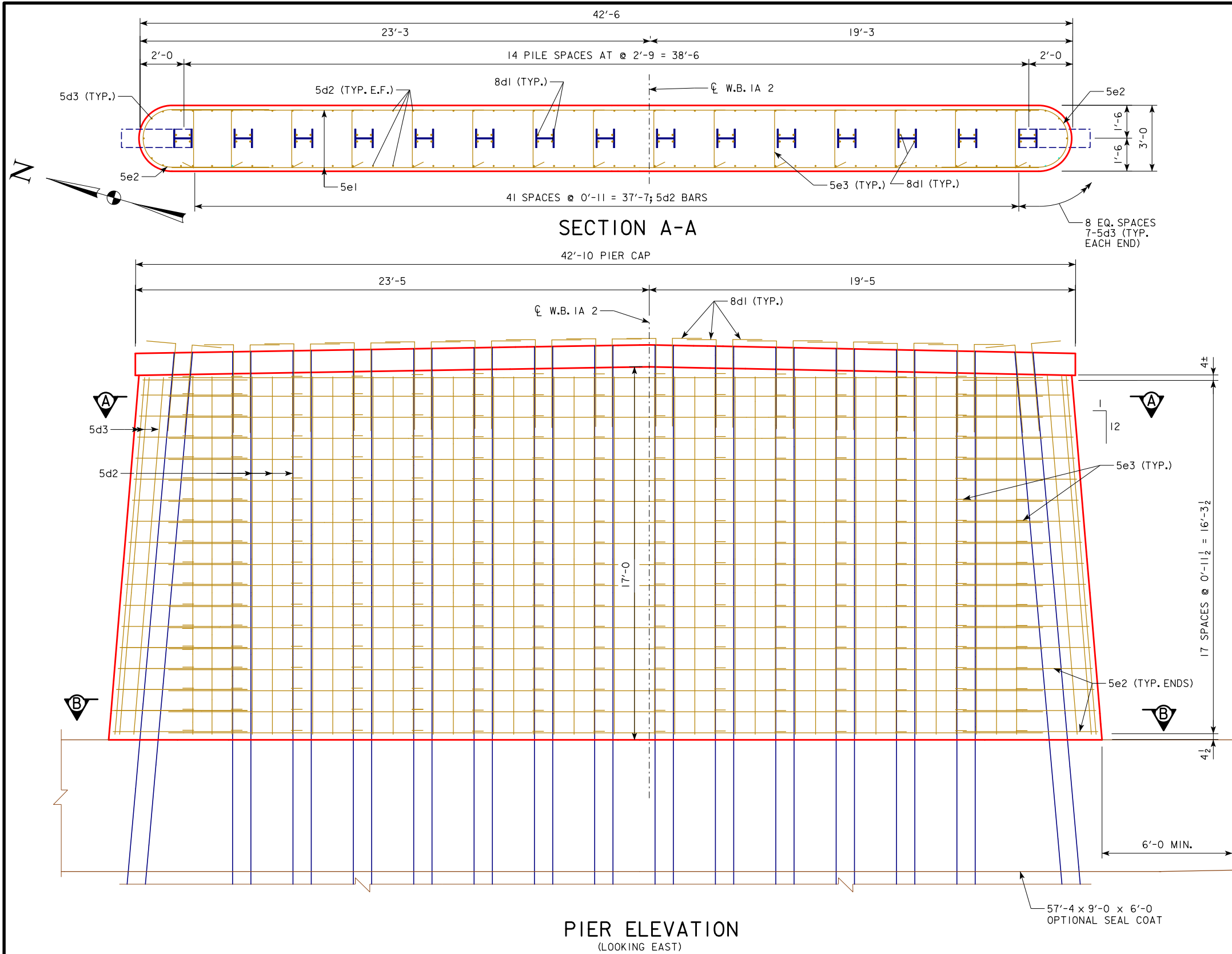
STAKING DIAGRAM

IA 2 STA. 1457+54.50, LT. 32.00'

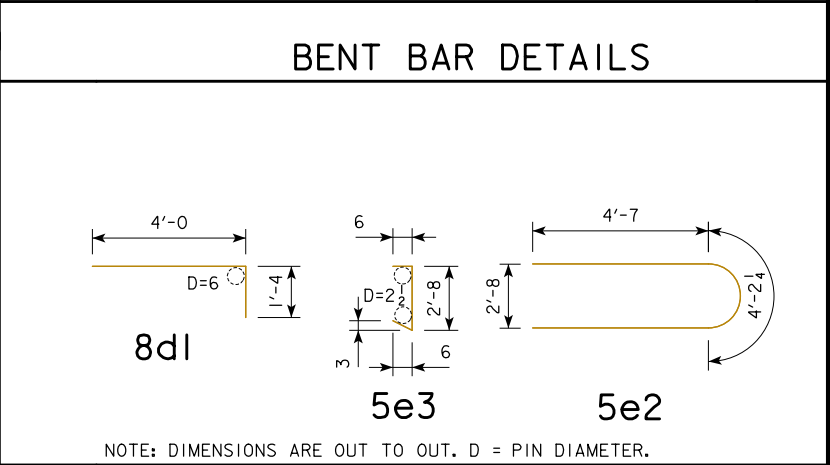
FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 24 FILE NO. 31911 DESIGN NO. 720



EPOXY COATED REINF. STEEL - ONE ENCASEMENT					
MARK	LOCATION	SHAPE	LENGTH	NO.	WEIGHT
8d1	ENCASEMENT TO CAP DOWELS		5'-4	60	854
5d2	ENCASEMENT, VERTICAL		16'-8	84	1460
5d3	ENCASEMENT, VERTICAL ENDS		16'-9	14	245
5e1	ENCASEMENT LONGITUDINAL		39'-6	36	1483
5e2	ENCASEMENT LONGITUDINAL, ENDS		13'-5	36	504
5e3	ENCASEMENT, TRANSVERSE TIES		3'-8	270	1033
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					5579



ESTIMATED QUANTITIES - ONE ENCASEMENT		
LOCATION	UNIT	
STRUCTURAL CONCRETE (BRIDGE)	C.Y.	81.7
REINFORCING STEEL EPOXY COATED	LBS.	5579
STEEL PILING HP 10 X 57	NO.	15

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

PILING NOTES:

15 - HP 10 X 57 STEEL PILING REQUIRED PER PIER.

PILE DIMENSIONS ARE TO TOP AND BOTTOM OF PILE ENCASEMENT.

BATTER PILING WHERE INDICATED 1:12 IN THE DIRECTION SHOWN.

ALL PILES LEVEL FOR 1'-0 EMBEDMENT INTO THE CAP.

NOTE:

- SEE DESIGN SHEET 9 FOR VIEW B-B.
- THE LUMP SUM BID ITEM, "EXCAVATE AND DEWATER" SHALL INCLUDE ALL COSTS ASSOCIATED WITH THE EXCAVATION AND DEWATERING REQUIRED TO CONSTRUCT THE PIER ENCASEMENTS IN THE DRY, IN ACCORDANCE WITH SECTION 2405, OF THE STANDARD SPECIFICATIONS. THE LENGTH AND WIDTH OF THE SEAL COAT WAS BASED ON THE REQUIRED ONE FOOT CLEARANCE BETWEEN THE TIP OF THE SHEET PILES AND THE BATTERED PILING. THE CONCRETE SEAL COAT, IF USED, SHALL BE 6.0 FEET THICK, BASED ON A WATER ELEVATION OF 920.0. IF THE WATER ELEVATION IS HIGHER THAN 920.0 AT THE TIME OF CONSTRUCTION, A LARGER SEAL COAT MAY BE REQUIRED TO MAINTAIN THE CLEARANCE BETWEEN THE SHEET PILES AND BATTERED PILING. THE BRIDGE ENGINEER SHALL BE NOTIFIED BEFORE USING A LARGER SEAL COAT.

DESIGN FOR 0° SKEW

209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS 59'-0 INTERIOR SPANS

PIER ENCASEMENT DETAILS

IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

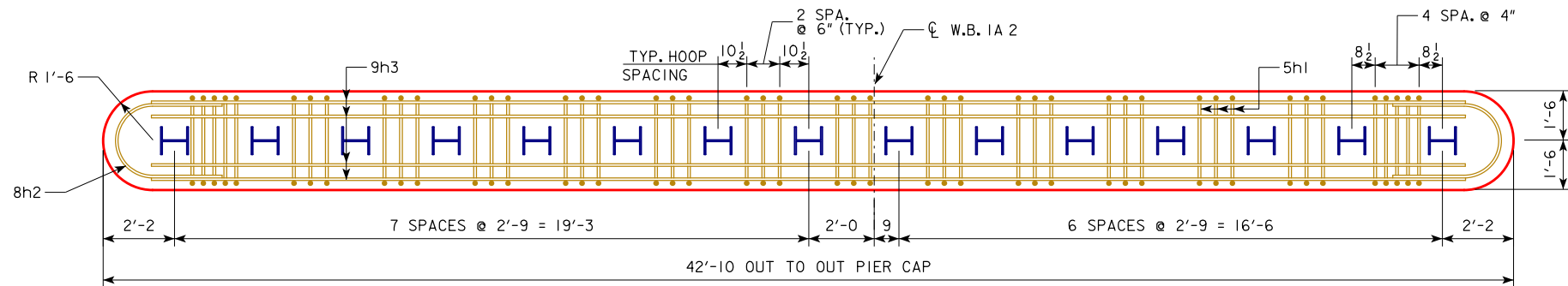
DESIGN SHEET NO. 7 OF 24 FILE NO. 31911 DESIGN NO. 720

PIER PILE LENGTHS	
	(LIN. FT.)
PIER 1	100
PIER 2	95
PIER 3	95

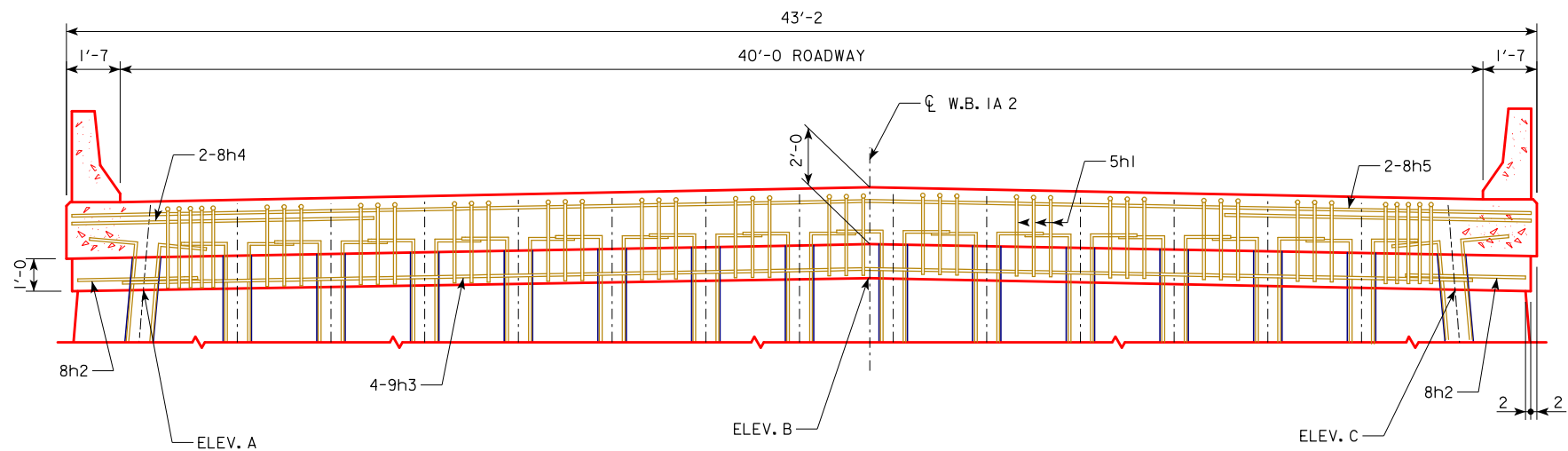
BOTTOM OF CAP ELEVATIONS

POINT	PIER 1	PIER 2	PIER 3
ELEV. A	923.12	923.37	923.49
ELEV. B	923.52	923.77	923.88
ELEV. C	923.20	923.45	923.57

BENCH MARK: SEE 'G' SHEETS WITHIN
TIED PROJECT ER-002-1(130)--28-36

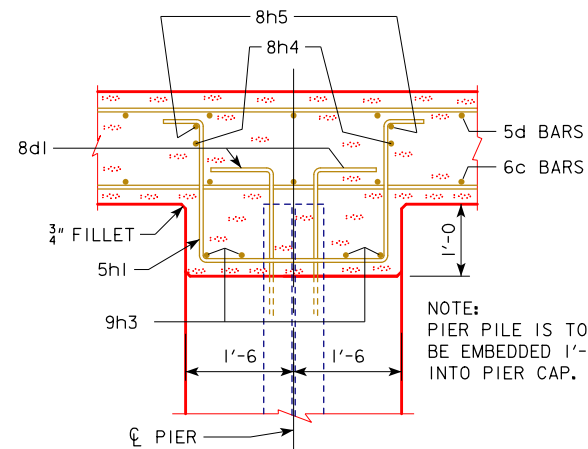


SECTION A-A



SECTION NEAR PIER

SHOWING STIRRUP SPACING AND NUMBER OF PILING
(15 - HP 10x57 PILES AT EACH PIER)
(LOOKING EAST)



TYPICAL CAP SECTION

PIER NOTES:

ALL MONOLITHIC PIER CAP REINFORCING AND CONCRETE IS INCLUDED IN SUPERSTRUCTURE ESTIMATE OF QUANTITIES.

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

THE PIER PILES ARE TO BE DRIVEN TO FULL PENETRATION, IF PRACTICABLE, BUT IN NO CASE TO A BEARING VALUE LESS THAN THE PILE BEARING REQUIRED AS SHOWN ON THIS SHEET. ADDITIONAL DRIVING CAPACITY MAY BE REQUIRED THROUGH SCOURABLE LAYERS. REFER TO GENERAL PLAN NOTES FOR ADDITIONAL INFORMATION.

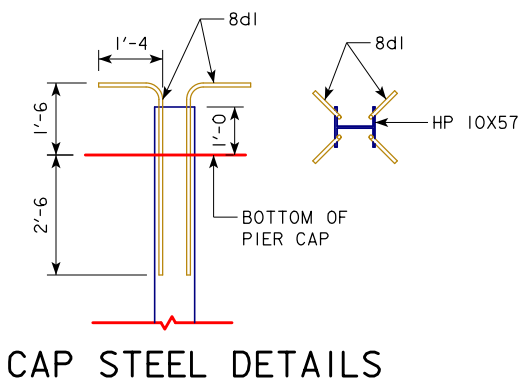
PIER PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

PILE BENT PILE DRIVING NOTES:

THE CONTRACT LENGTH SHOWN IN THE PIER PILE LENGTH TABLE ON DESIGN SHEET 7 IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 202 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF ENCASEMENT.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER PILES IS 166 TONS AT END OF DRIVE IF THE OPTIONAL SEAL COAT IS USED, 140 TONS AT END OF DRIVE IF THE OPTIONAL SEAL COAT IS NOT USED. THE PILE CONTRACT LENGTHS SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



CAP STEEL DETAILS

DESIGN FOR 0° SKEW

**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**

45'-6 END SPANS 59'-0 INTERIOR SPANS

MONOLITHIC PIER CAP DETAILS

1A 2 STA. 1457+54.50, LT. 32.00'

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

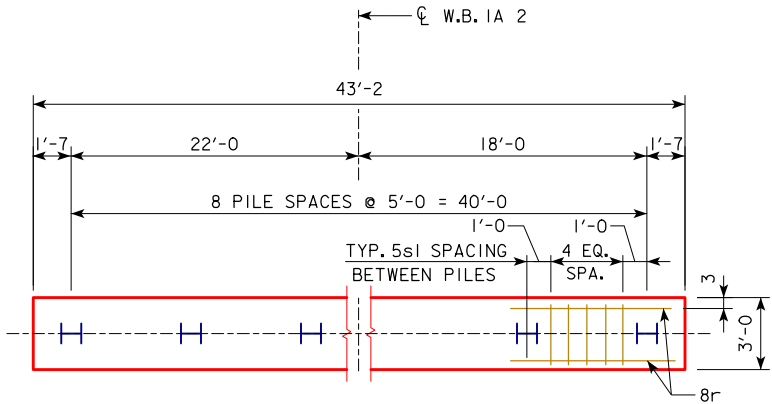
DESIGN SHEET NO. 8 OF 24 FILE NO. 31911 DESIGN NO. 720

ABUTMENT PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 100 FEET (WEST ABUTMENT) AND 85 (EAST ABUTMENT) PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 128 KIPS, AND A GEOTECHNICAL RESISTANCE OF (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR BOTH ABUTMENTS IS 110 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.

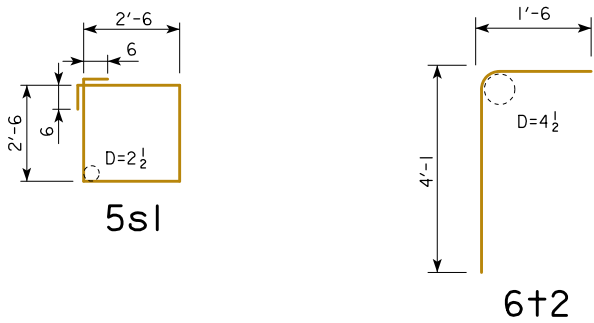


ABUTMENT PILING LAYOUT
(WEST ABUTMENT SHOWN, EAST ABUTMENT SIMILAR)

REINFORCING STEEL - ONE ABUT. FTG.

MARK	LOCATION	SHAPE	LENGTH	NO.	WEIGHT
8r1	ABUTMENT FOOTING LONGITUDINAL		42'-10"	7	801
5s1	ABUTMENT FOOTING HOOPS		11'-0"	44	505
6+1	FOOTING TO SLAB DOWELS		5'-0"	46	345
6+2	FOOTING TO SLAB DOWELS		5'-7"	46	386
#2	PILE SPIRAL		38'-6"	9	58
	SPIRAL SPACERS - L 7/8 X 7/8 X 1/8 X 0.70		1'-10"	27	35
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					2130

BENT BAR DETAILS

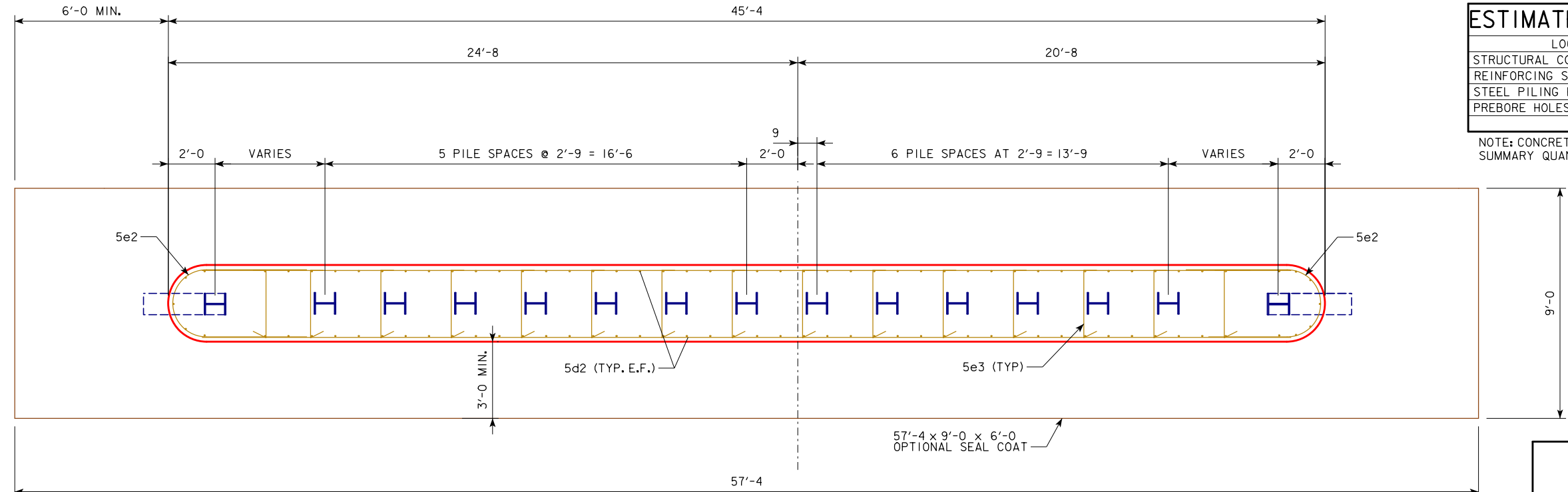


NOTE: DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

ESTIMATED QUANTITIES - ONE ABUT. FTG.

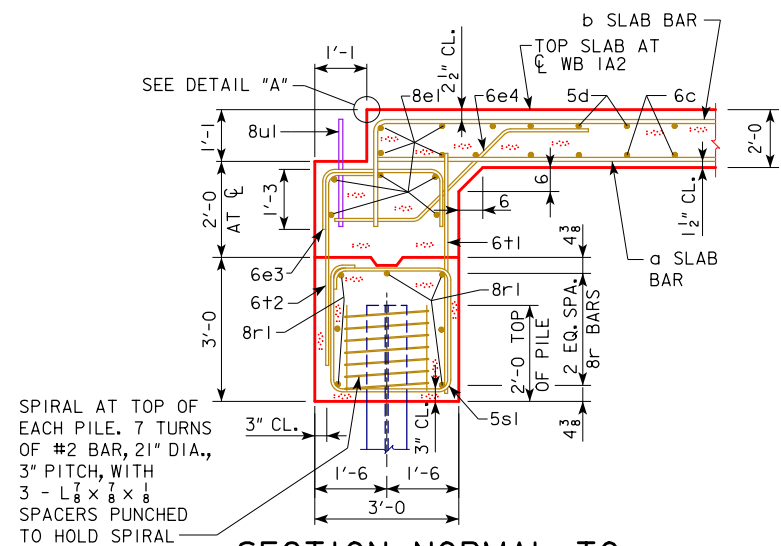
LOCATION	UNIT	
STRUCTURAL CONCRETE (BRIDGE)	C.Y.	14.4
REINFORCING STEEL EPOXY COATED	LBS.	2130
STEEL PILING HP 10 X 57	NO.	9
PREBORE HOLES	FT.	90

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

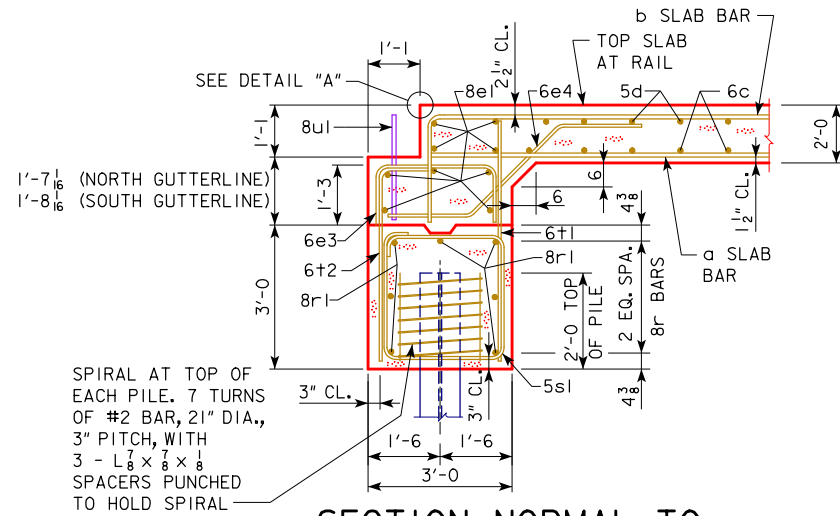


PIER ENCASEMENT
VIEW B-B

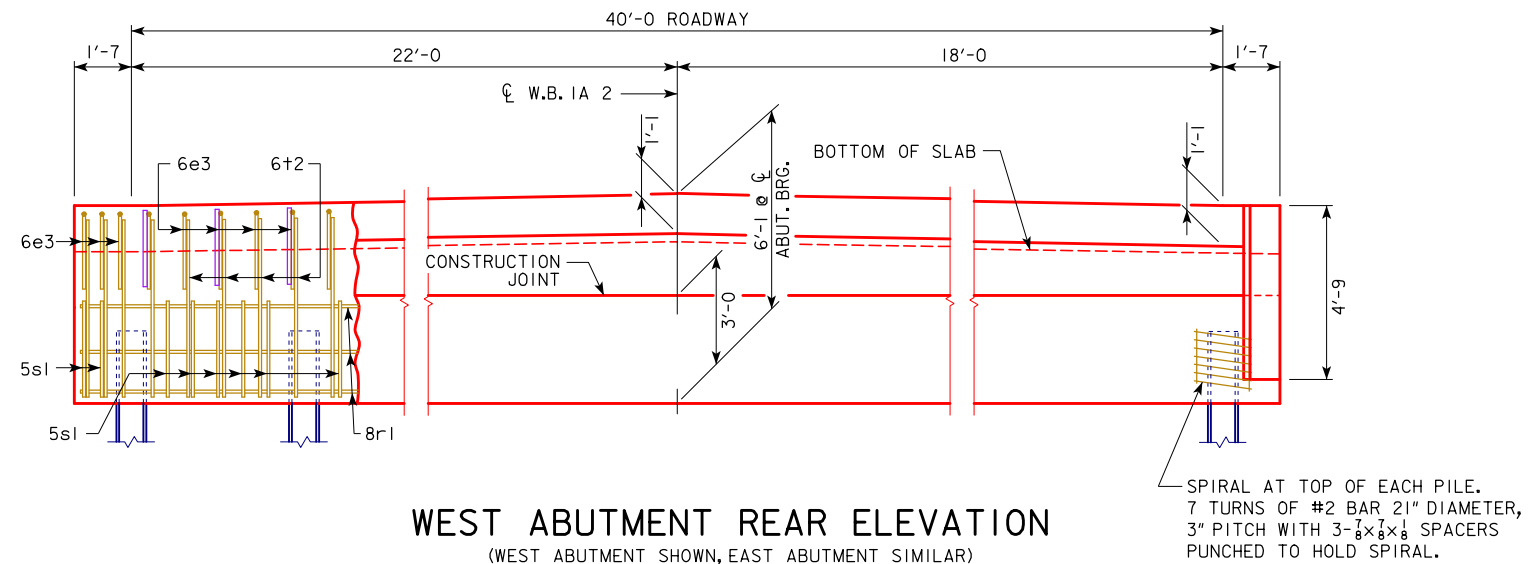
DESIGN FOR 0° SKEW
209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE
45'-6 END SPANS 59'-0 INTERIOR SPANS
SUBSTRUCTURE DETAILS
1A 2 STA. 1457+54.50, LT. 32.00' MAY 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 9 OF 24 FILE NO. 31911 DESIGN NO. 720



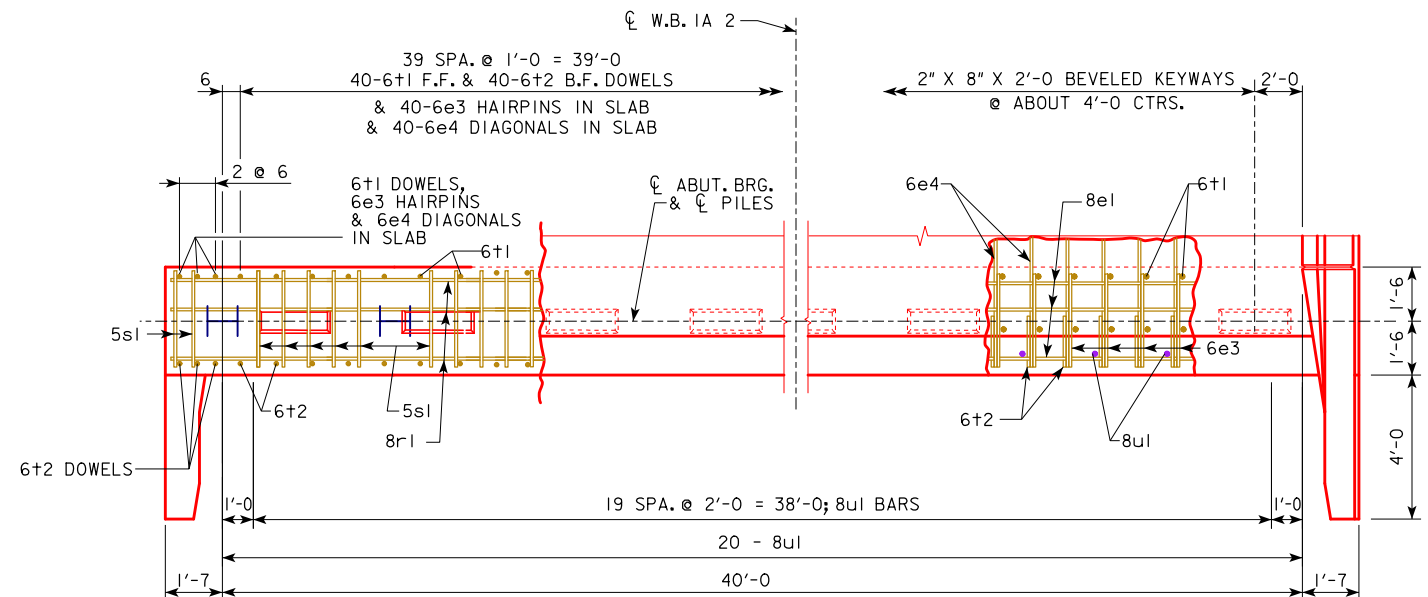
SECTION NORMAL TO
ABUTMENT AT CL WB IA 2



SECTION NORMAL TO
ABUTMENT AT GUTTERLINE



WEST ABUTMENT REAR ELEVATION
(WEST ABUTMENT SHOWN, EAST ABUTMENT SIMILAR)



WEST ABUTMENT PLAN VIEW

ABUTMENT NOTES:

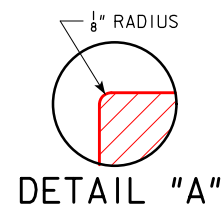
ALL PILING ARE HP 10 X 57.

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

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

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



DETAIL "A"

DESIGN FOR 0° SKEW

209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS 59'-0 INTERIOR SPANS

ABUTMENT DETAILS

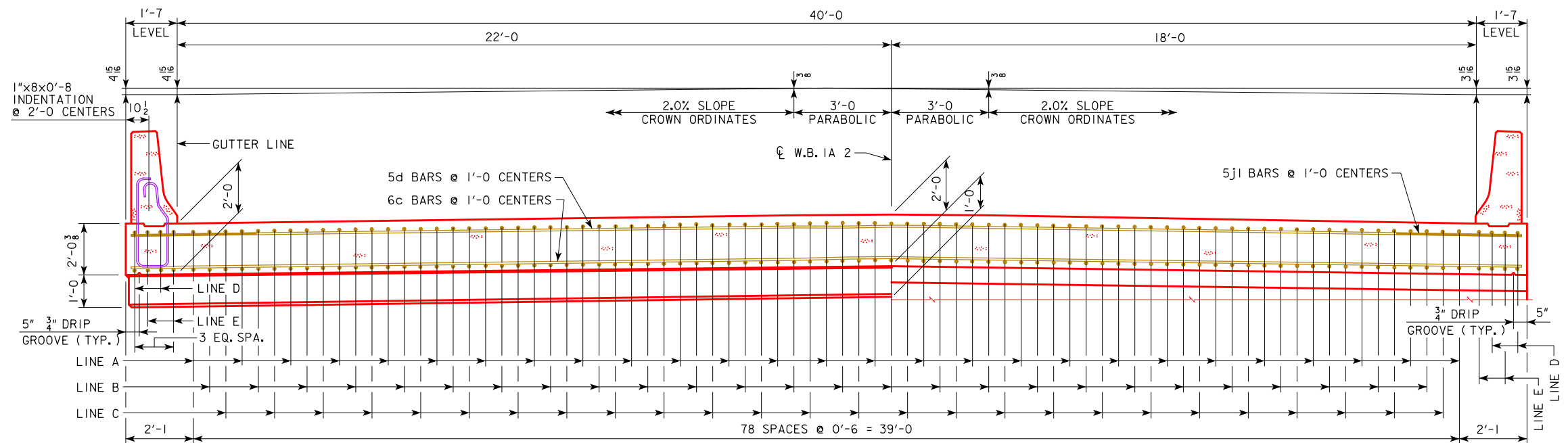
IA 2 STA. 1457+54.50, LT. 32.00'

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 24 FILE NO. 31911 DESIGN NO. 720

MAY 2020



HALF SECTION NEAR PIER

HALF SECTION NEAR ABUTMENT

- NOTE:
1. SEE DESIGN SHEET 13 FOR TRANSVERSE REINFORCING STEEL LAYOUT.
 2. SEE DESIGN SHEET 14 FOR PLACEMENT FOR LONGITUDINAL REINFORCING.
 3. SEE DESIGN SHEET 15 FOR BAR LIST AND BENT BAR DETAILS.
 4. SEE DESIGN SHEET 17 FOR CAMBER DIAGRAM.

DESIGN FOR 0° SKEW

209'-0" X 40'-0" CONTINUOUS CONCRETE SLAB W.B. BRIDGE

45'-6" END SPANS 59'-0" INTERIOR SPANS

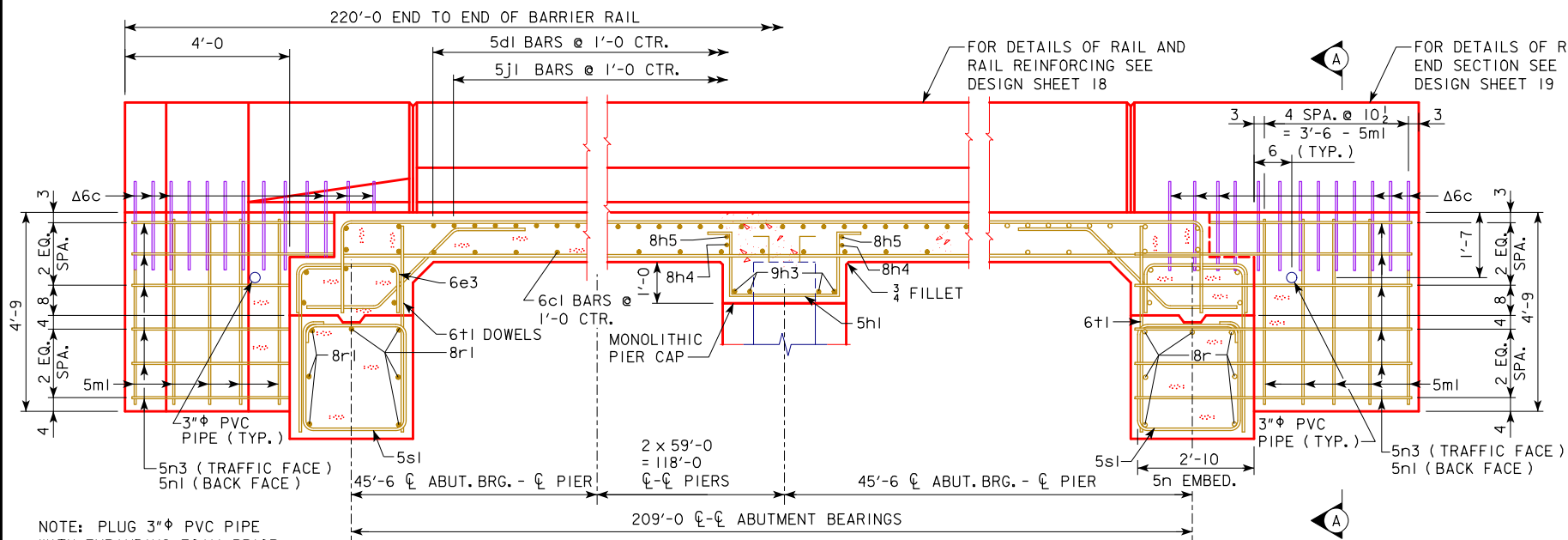
SUPERSTRUCTURE DETAILS

IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020

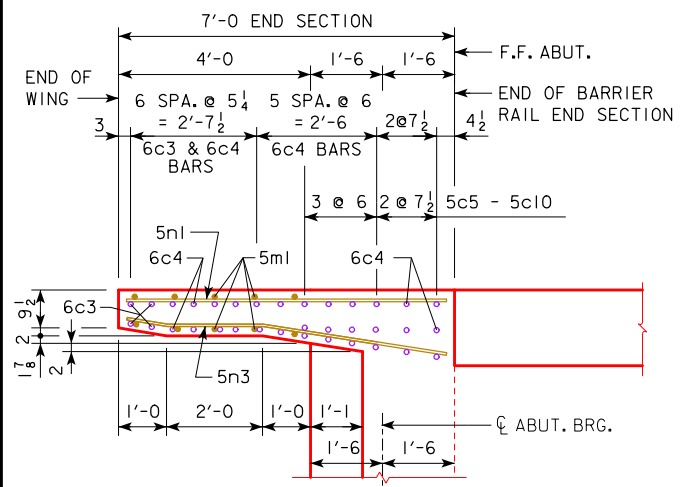
FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

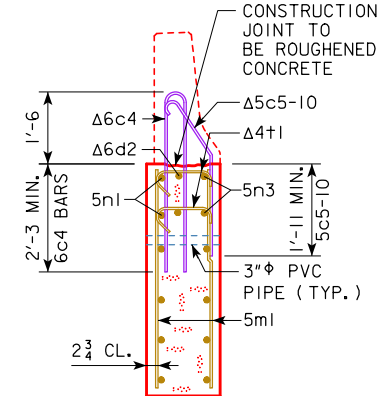
DESIGN SHEET NO. 11 OF 24 FILE NO. 31911 DESIGN NO. 720



PART LONGITUDINAL SECTION NEAR GUTTER LINE



PART PLAN
(RAILING NOT SHOWN)



SECTION A-A

Δ NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4t1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

NOTE: 5m1 & 5n1 BARS ARE INCLUDED IN SUPERSTRUCTURE BAR LIST. 5c, 6c, 6d & 4t1 BARS ARE INCLUDED IN BARRIER RAIL BAR LIST.

SUPERSTRUCTURE NOTES:

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

THE SLAB AS SHOWN INCLUDES A 1/2 INCH INTEGRAL WEARING SURFACE.

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

THE CONCRETE SLAB IS TO BE PLACED WITH A MINIMUM OF CONSTRUCTION JOINTS. PROCEDURES FOR PLACING SLAB CONCRETE SHALL 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 RESULT. SLAB FALSEWORK SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE BARRIER RAILS.

NOTE THAT WHEN PORTLAND CEMENT APPROACH PAVEMENT IS PLACED, COMPRESSIBLE JOINT MATERIAL MUST BE USED BETWEEN PAVEMENT AND END OF BRIDGE.

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.

COST OF FURNISHING AND PLACING 3" PVC PIPE IN EACH WING IS INCLUDED IN THE PRICE BID FOR STRUCTURAL CONCRETE.

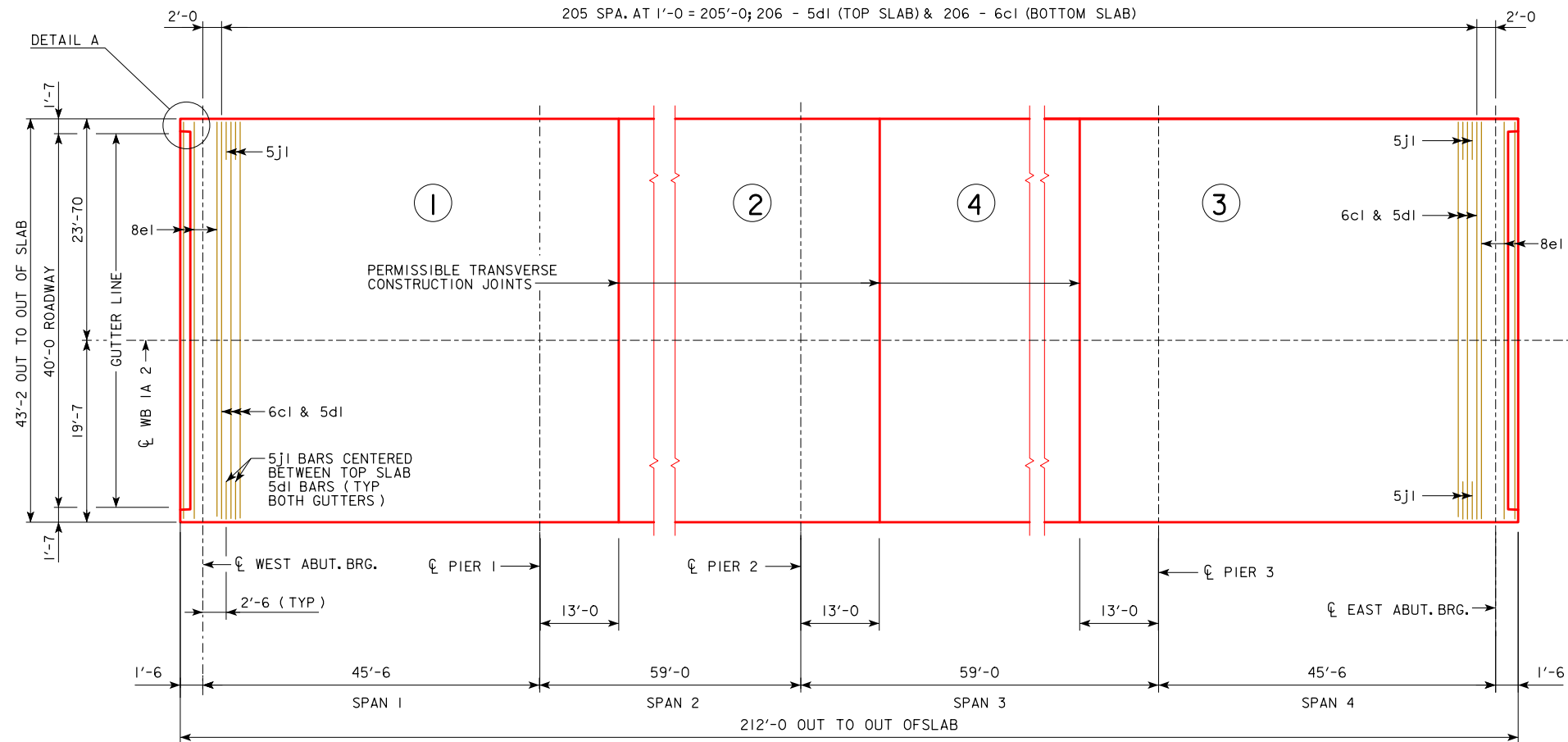
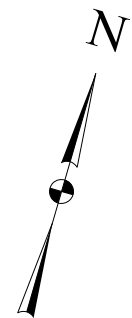
BAR CHAIR NOTE:

TOP MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY. THE BOTTOM MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0 APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND SLAB BOLSTERS.

DESIGN FOR 0° SKEW	
209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE	
45'-6 END SPANS	59'-0 INTERIOR SPANS
LONGITUDINAL SECTION	
IA 2 STA. 1457+54.50, LT. 32.00'	
FREMONT COUNTY	
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION	
DESIGN SHEET NO. 12 OF 24	FILE NO. 31911
DESIGN NO. 720	

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.

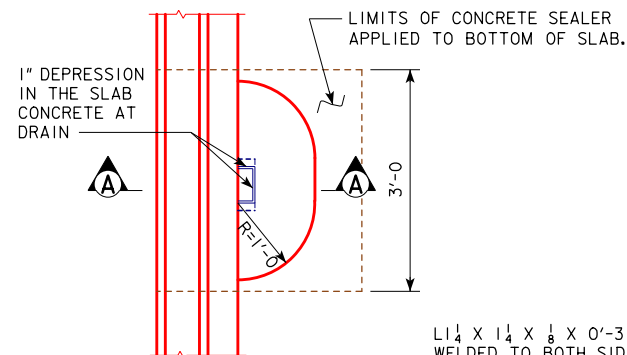
REVISED 07-09 - CHANGED THE DRAIN ANGLES DETAILS ON SECTION A-A.



TRANSVERSE REINFORCING STEEL LAYOUT

NOTE:
CONCRETE SLAB SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. PLACING THE CONCRETE SLAB IN ONE CONTINUOUS POUR IS PROHIBITED AND WILL NOT BE CONSIDERED FOR APPROVAL AS AN ALTERNATE PROCEDURE. ALTERNATE PROCEDURES FOR PLACING SLAB 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. THE BRIDGE ENGINEER SHALL REVIEW ANY ALTERNATE PROCEDURES. THE COST OF ANY ADDITIONAL ANALYSIS AND PLAN MODIFICATIONS SHALL BE PAID FOR BY THE CONTRACTOR. THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE SLAB DURING PLACEMENT.

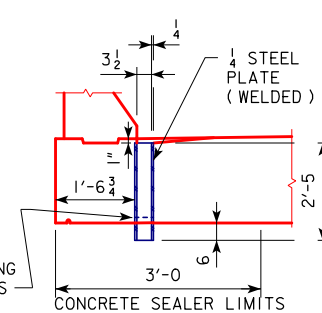
NOTE:
TRANSVERSE SLAB REINFORCING MAY BE SPLICED WITH ONE LAP LOCATED AT CENTERLINE OF ROADWAY. PAYMENT FOR REINFORCING BARS SHALL BE BASED ON NO SPLICES, AND NO ALLOWANCE SHALL BE MADE FOR THE ADDITIONAL LENGTH OF BAR REQUIRED FOR THE USE OF SPLICES. MINIMUM LAP LENGTH FOR 6c1 BARS IS 1'-8, AND MINIMUM LAP LENGTH FOR 5d1 BARS IS 2'-0.



PART PLAN

NOTE: 4" X 8" OUTSIDE DIMENSION ROLLED TUBE WITH 1/4" WALL THICKNESS MAY BE SUBSTITUTED FOR THE WELDED DRAIN SHOWN.

1 1/4" X 1 1/4" X 1/8" X 0'-3"
WELDED TO BOTH SIDES
OF DRAIN WITH 2-1/4" Ø
HOLES IN EACH OUTSTANDING
LEG FOR NAILING TO FORMS

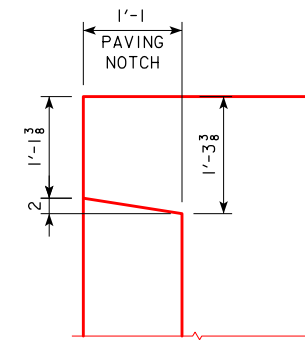


SECTION A-A

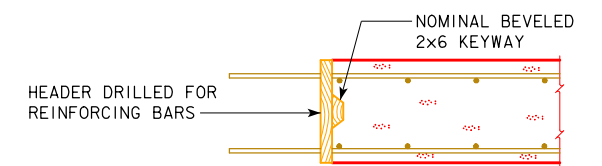
FLOOR DRAIN DETAILS

SEE SITUATION PLAN FOR DRAIN LAYOUT
(DRAIN WEIGHT = 48 LBS EACH)

NOTE: DRAINS ARE TO BE GALVANIZED. INCLUDE COST OF DRAINS
IN PRICE BID FOR "HIGH PERFORMANCE STRUCTURAL CONCRETE". 12 DRAINS REQUIRED.



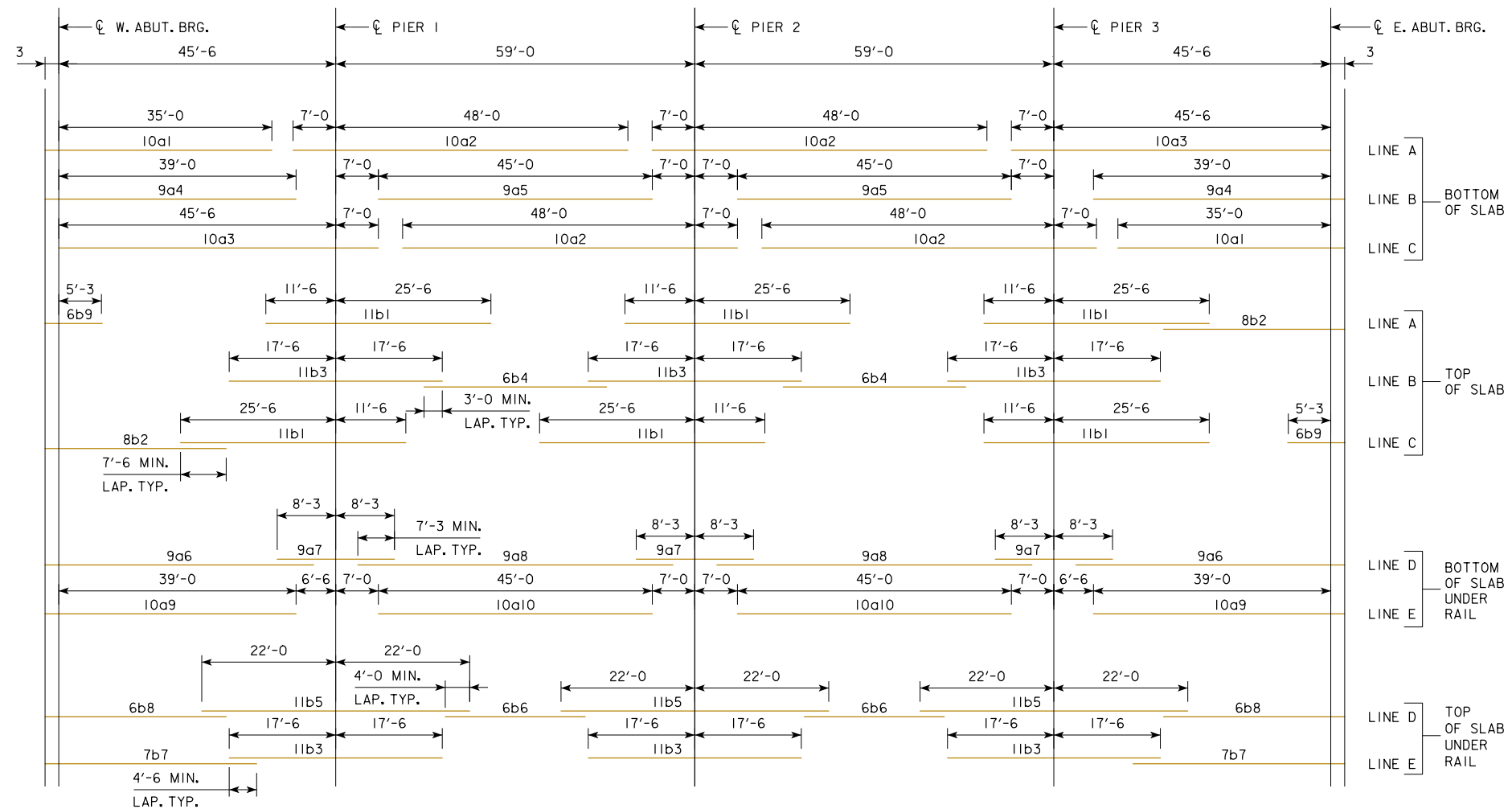
DETAIL A



TRANSVERSE CONSTR. JOINT

NOTE:
SEE DETAIL SHEET 14 FOR PLACEMENT OF LONGITUDINAL
REINFORCING.

DESIGN FOR 0° SKEW	
209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE	
45'-6 END SPANS	59'-0 INTERIOR SPANS
SUPERSTRUCTURE DETAILS	
IA 2 STA. 1457+54.50, LT. 32.00'	MAY 2020
FREMONT COUNTY	
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION	
DESIGN SHEET NO. 13 OF 24	FILE NO. 31911 DESIGN NO. 720



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

DESIGN FOR 0° SKEW

**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**

45'-6 END SPANS 59'-0 INTERIOR SPANS

SUPERSTRUCTURE DETAILS

1A 2 STA. 1457+54.50, LT. 32.00' MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 14 OF 24 FILE NO. 31911 DESIGN NO. 720

EPOXY COATED REINFORCING


[illegible]

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.
INCLUDES 4 ABUTMENT WINGS @ 0.68 C.Y. EACH, EXCLUDES RAIL CONCRETE.

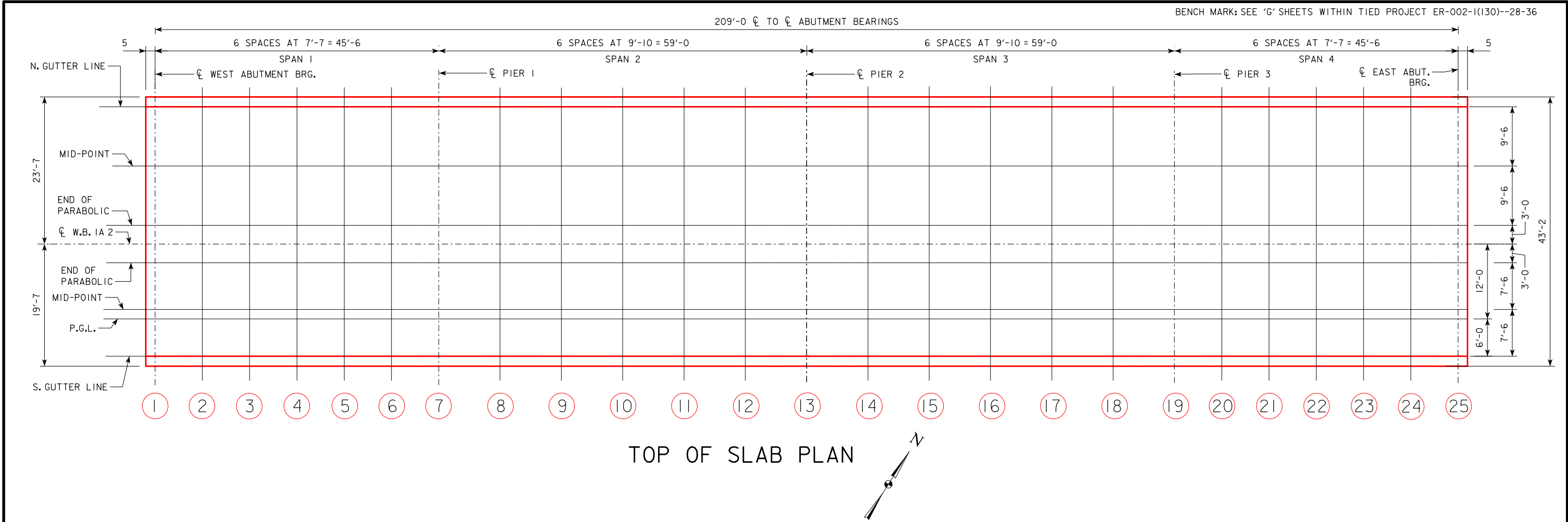
LOCATION	QUANTITY
SECTION 1, SLAB, ABUT. DIAPH., ABUT. WINGS, & PIER CAP	200.7
SECTION 2, SLAB & PIER CAP	193.7
SECTION 3, SLAB, ABUT. DIAPH., ABUT. WINGS, & PIER CAP	200.7
SECTION 4, SLAB	105.6
TOTAL (CU. YDS.)	700.7

Figure 1: Examples of dimensioning for various shapes. The figure contains five sub-diagrams labeled 8h2, 6e3, 5h1, 6b9, 8b2, 7b7, & 6b8, and 5n3. Each diagram shows a shape with its dimensions labeled in feet and inches. 8h2 shows a U-shaped object with a semi-circular end. 6e3 shows a stepped object. 5h1 shows a stepped object with a semi-circular end. 6b9, 8b2, 7b7, & 6b8 shows a stepped object with a semi-circular end. 5n3 shows a long object with a semi-circular end and a sloped section.

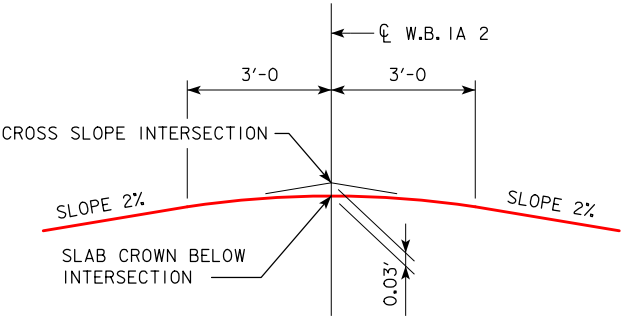
STAINLESS STEEL REINFORCING FOR SUPERSTRUCTURE

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8u1	ABUTMENT PAVING NOTCH BAR		40	2'-1	223
REINFORCING STEEL STAINLESS STEEL - TOTAL (LBS.)					223

DESIGN FOR 0° SKEW
209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE
45'-6 END SPANS 59'-0 INTERIOR SPANS
SUPERSTRUCTURE QUANTITIES
IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 15 OF 24 FILE NO. 31911 DESIGN NO. 720



TOP OF SLAB ELEVATIONS																									
	C WEST ABUT.BRG.						C PIER 1 BEARING						C PIER 2 BEARING						C PIER 3 BEARING						C WEST ABUT.BRG.
LOCATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
N. GUTTER LINE	926.01	926.02	926.03	926.05	926.06	926.08	926.11	926.14	926.18	926.23	926.27	926.32	926.36	926.39	926.42	926.44	926.46	926.47	926.47	926.47	926.47	926.47	926.46	926.45	926.43
MID-POINT	926.20	926.21	926.22	926.24	926.25	926.27	926.30	926.33	926.37	926.42	926.46	926.51	926.55	926.58	926.61	926.63	926.65	926.66	926.66	926.66	926.66	926.66	926.65	926.64	926.62
END OF PARABOLIC	926.39	926.40	926.41	926.43	926.44	926.46	926.49	926.52	926.56	926.61	926.65	926.70	926.74	926.77	926.80	926.82	926.84	926.85	926.85	926.85	926.85	926.85	926.84	926.83	926.81
C W.B. 1A 2	926.42	926.43	926.44	926.46	926.47	926.49	926.52	926.55	926.59	926.64	926.68	926.73	926.77	926.80	926.83	926.85	926.87	926.88	926.88	926.88	926.88	926.88	926.87	926.86	926.84
END OF PARABOLIC	926.39	926.40	926.41	926.43	926.44	926.46	926.49	926.52	926.56	926.61	926.65	926.70	926.74	926.77	926.80	926.82	926.84	926.85	926.85	926.85	926.85	926.85	926.84	926.83	926.81
MID-POINT	926.24	926.25	926.26	926.28	926.29	926.31	926.34	926.37	926.41	926.46	926.50	926.55	926.59	926.62	926.65	926.67	926.69	926.70	926.70	926.70	926.70	926.70	926.69	926.68	926.66
S. GUTTER LINE	926.09	926.10	926.11	926.13	926.14	926.16	926.19	926.22	926.26	926.31	926.35	926.40	926.44	926.47	926.50	926.52	926.54	926.55	926.55	926.55	926.55	926.55	926.54	926.53	926.51



NOTE:
THE TOP OF SLAB ELEVATIONS FOR THE HIGH POINT ON THE BRIDGE
SLAB ARE 0.03 FEET BELOW THE HIGH POINT ON THE APPROACH
ROADWAY TO ACCOUNT FOR THE ROUNDING OF THE SLAB WITH A
PARABOLIC TEMPLATE AT THE CROSS SLOPE INTERSECTION.

DESIGN FOR 0° SKEW

**209'-0" X 40'-0" CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**

45'-6" END SPANS 59'-0" INTERIOR SPANS

TOP OF SLAB ELEVATIONS

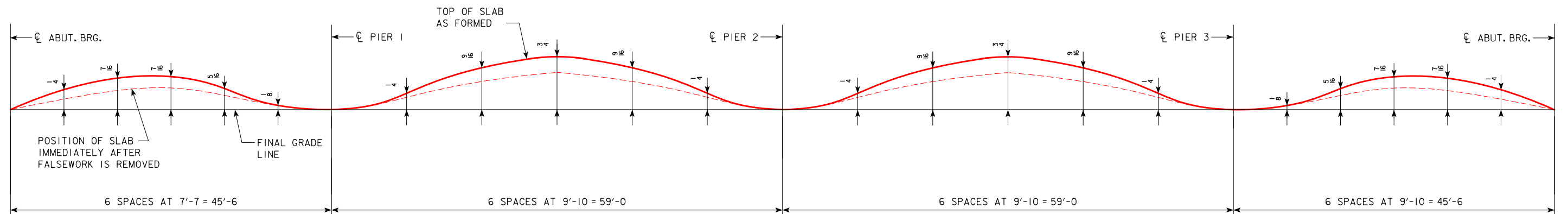
IA 2 STA. 1457+54.50, LT. 32.00'

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 16 OF 24 FILE NO. 31911 DESIGN NO. 720

MAY 2020

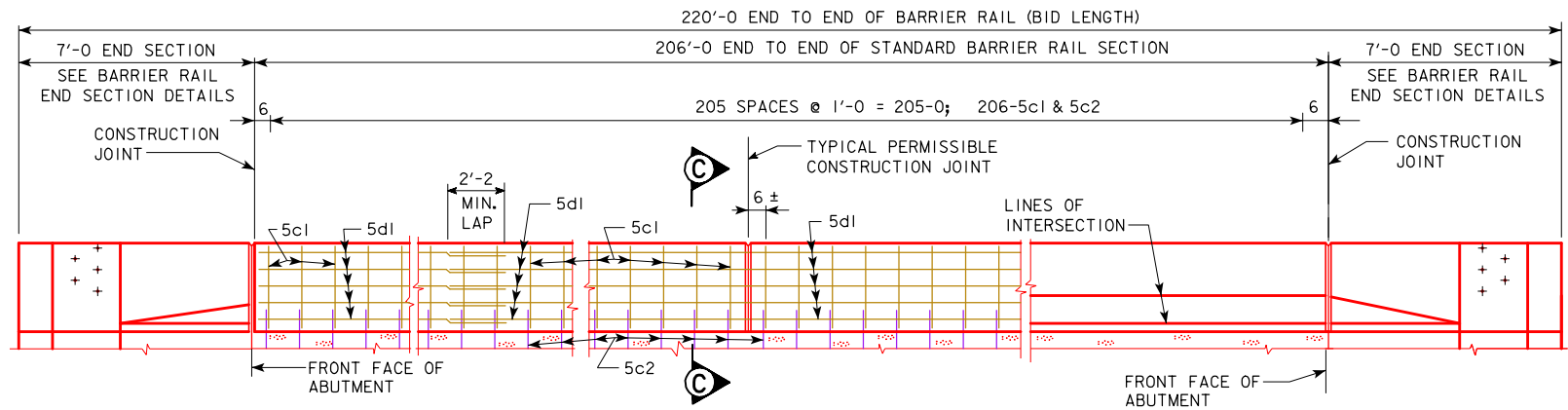


FORM CAMBER DIAGRAM

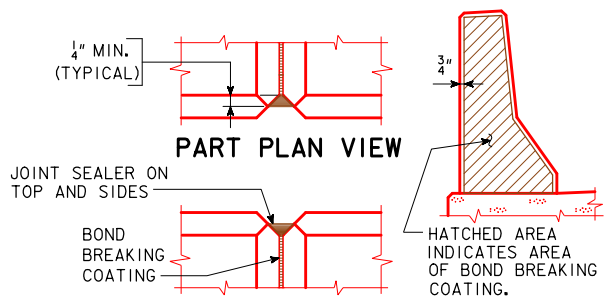
THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FALSEWORK SETTLEMENT.

DESIGN FOR 0° SKEW		
209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE		
45'-6 END SPANS		59'-0 INTERIOR SPANS
CAMBER DIAGRAM		
IA 2 STA. 1457+54.50, LT. 32.00'		MAY 2020
FREMONT COUNTY		
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION		
DESIGN SHEET NO. 17 OF 24	FILE NO. 31911	DESIGN NO. 720

REVISED 07-16 DATE ON SHEET CHANGED TO CORRECT CLERICAL ERROR.



ELEVATION OF BARRIER RAIL LAYOUT

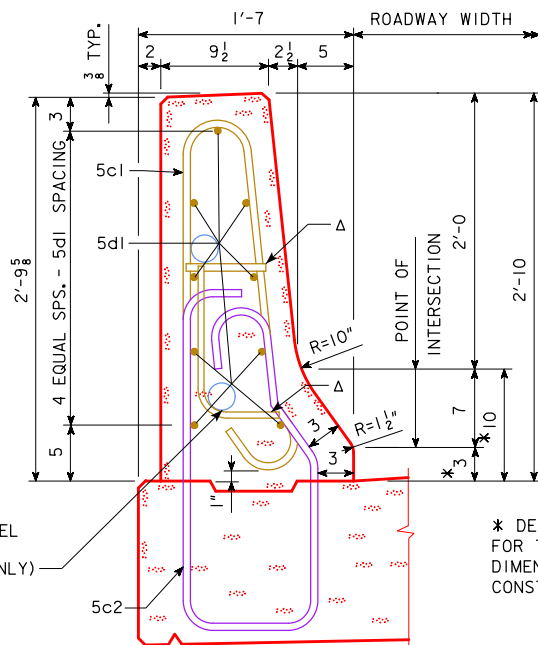


NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

Δ NOTE: CONDUIT SUPPORT BAR DETAILS AND QUANTITIES ARE ON DESIGN SHEET 20 (NORTH RAIL ONLY)

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 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. 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 MARKETING FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.
TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL G GRADE.
CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.



PART SECTION C-C

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

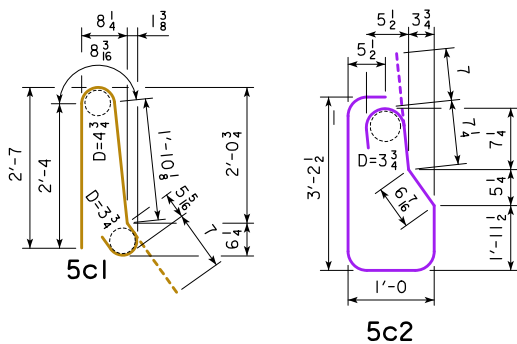
EPOXY COATED REINF. STEEL - TWO RAILS

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTIONS	5c1	RAIL, VERTICAL		412	5'-11"	2542
	5dl	RAIL, LONGITUDINAL		108	36'-2"	4074
EPOXY STEEL TOTAL (LBS.)						6616

STAINLESS STEEL REINF. STEEL - TWO RAILS

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STD. SECTIONS	5c2	RAIL, VERTICAL		412	8'-5"	3616
STAINLESS STEEL TOTAL (LBS.)						3616

BENT BAR DETAILS



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

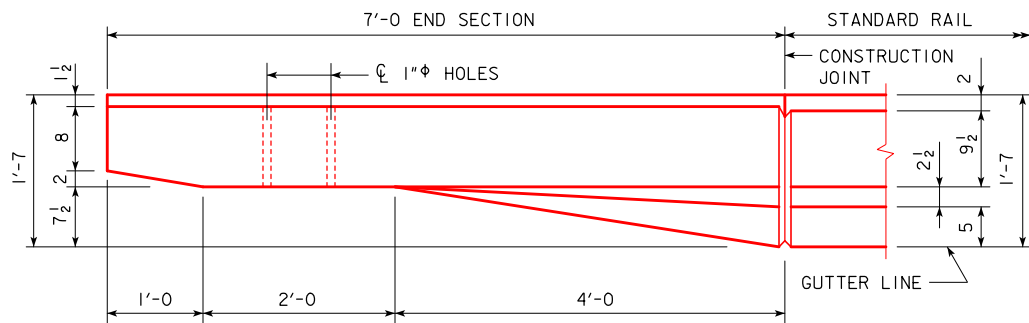
CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
NORTH RAIL STANDARD SECTION 206'-0" @ 0.1052 CU. YD. PER FT.	21.7
SOUTH RAIL STANDARD SECTION 206'-0" @ 0.1052 CU. YD. PER FT.	21.7
TOTAL (CU. YD.)	43.4

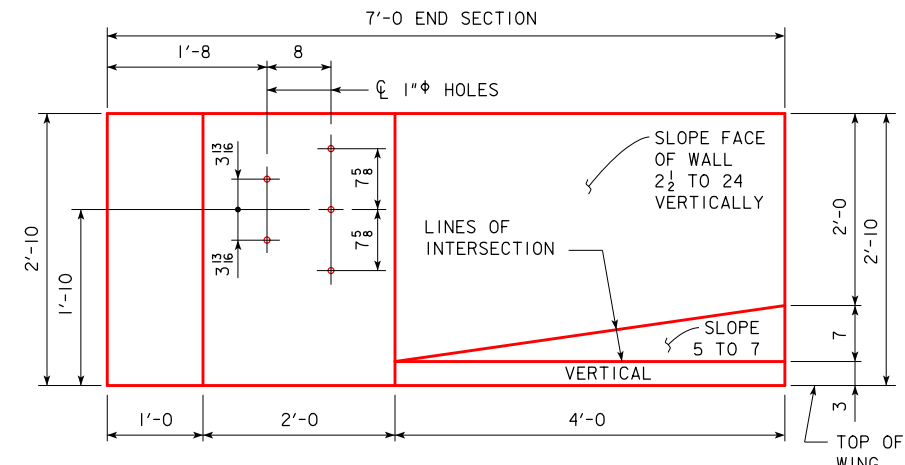
CONCRETE BARRIER RAIL QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE BARRIER RAILING 2 @ 220'-0"	L.F.	440.0

DESIGN FOR 0° SKEW
209'-0" X 40'-0" CONTINUOUS
CONCRETE SLAB W.B. BRIDGE
45'-6" END SPANS 59'-0" INTERIOR SPANS
BARRIER RAIL DETAILS
IA 2 STA. 1457+54.50, LT. 32.00'
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 18 OF 24 FILE NO. 31911 DESIGN NO. 720

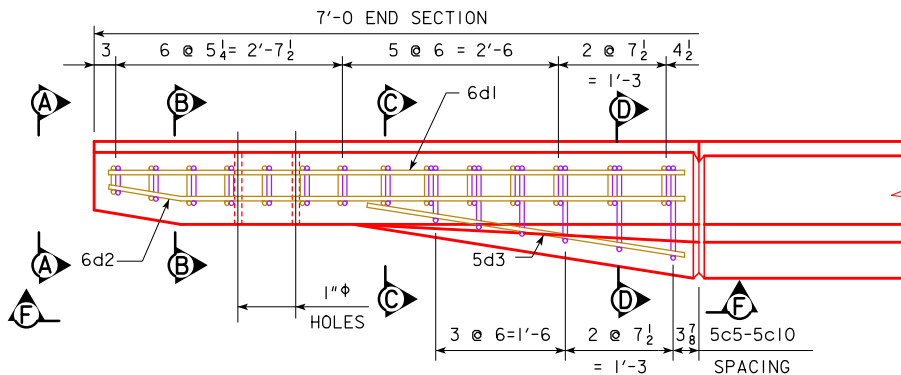


PART PLAN VIEW

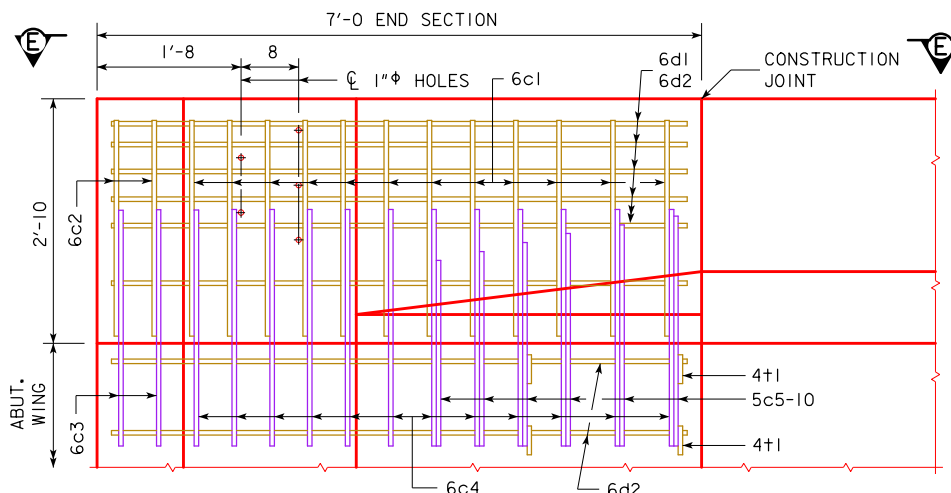


PART ELEVATION VIEW

PROVIDE 5 HOLES FORMED WITH 1" ϕ PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



PART VIEW E-E



PART VIEW F-F

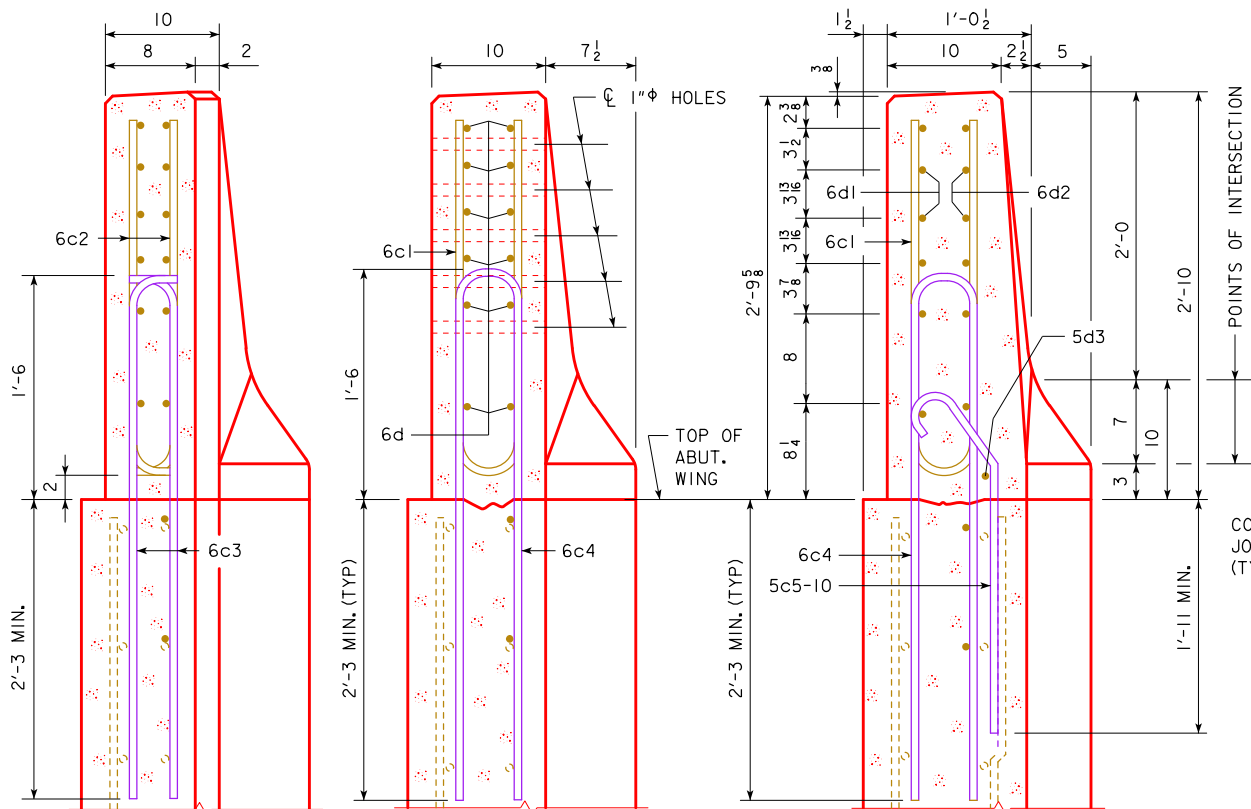
NOTE:
4+1 PLACEMENT- 2 BARS EACH
LEVEL OF 6d2 IN WING FOOTING.

NOTE:
CONSTRUCTION JOINT BETWEEN
TOP OF WING AND BARRIER
RAIL IS ROUGHENED CONCRETE.

NOTE:
THE 10" RADIUS AND 1 1/2" RADIUS
ARE TYPICAL AND SHALL BE
USED WHEN CONSTRUCTING THE
CORNERS FOR VIEW A-A,
SECTION B-B, SECTION C-C AND
SECTION D-D.

NOTE:
THE 6c4, 6c3, 5c5-10, 2- 6d2 AND
4+1 BARS ARE TO BE PLACED
WITH THE ABUTMENT WING. THE
DETAILS FOR PLACEMENT ARE
SHOWN ON THE WING ABUTMENT
SHEET.

NOTE:
DASHED LINES BELOW THE TOP OF
WING ARE THE ABUTMENT WING
REINFORCING STEEL. SEE WING
ABUTMENT SHEET FOR PLACEMENT.



VIEW A-A

SECTION B-B

SECTION C-C

SECTION D-D

EPOXY COATED REINF. STEEL - ONE END SECT.

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	RAIL, VERTICAL		12	5'-6	99
6c2	RAIL, VERTICAL		4	2'-10	17
6d1	RAIL, HORIZONTAL		6	6'-8	60
6d2	RAIL, HORIZONTAL		8	6'-9	81
5d3	RAIL, HORIZONTAL		1	3'-9	4
4+1	RAIL, ABUTMENT WING TIE BARS		4	VARIES	5
EPOXY REINF. TOTAL WEIGHT (LBS.)					266

STAINLESS STEEL REINF. STEEL - ONE END SECT.

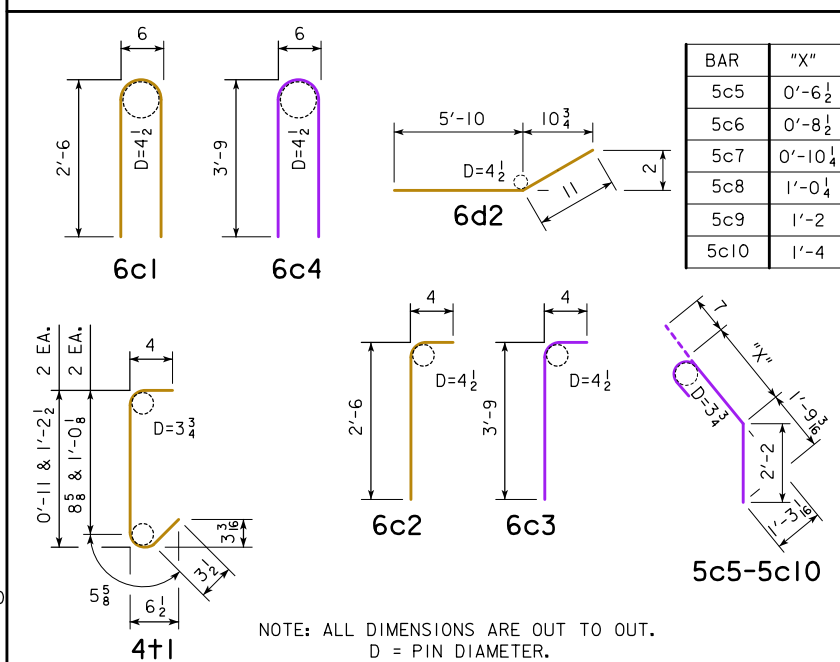
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c3	RAIL, VERTICAL		4	4'-1	25
6c4	RAIL, VERTICAL		12	8'-0	144
5c5-10	RAIL, VERTICAL		6	VARIES	23
STAINLESS STEEL TOTAL WEIGHT (LBS.)					192

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

CONCRETE PLACEMENT SUMMARY

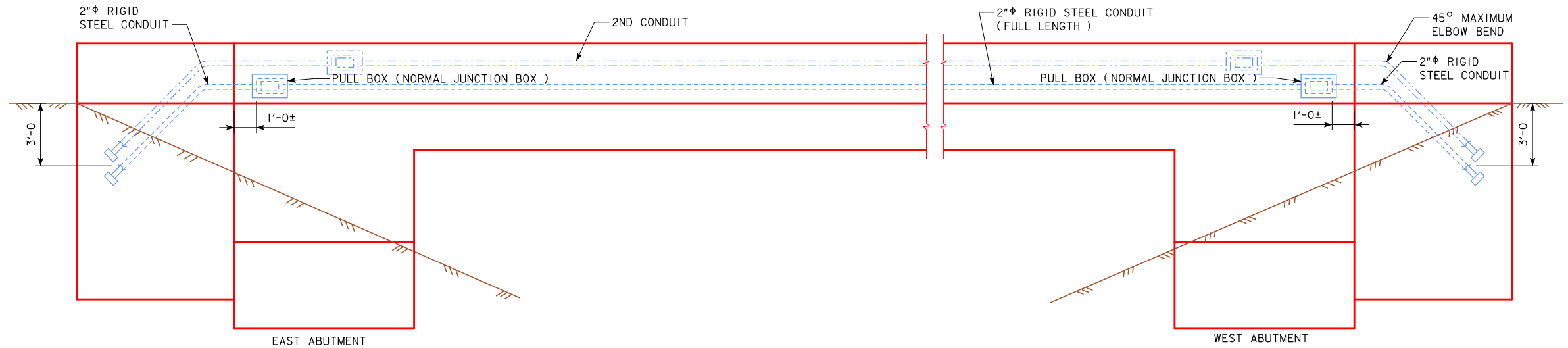
SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

BENT BAR DETAILS



DESIGN FOR 0° SKEW
**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**
45'-6 END SPANS 59'-0 INTERIOR SPANS
BARRIER RAIL END SECTION DETAILS
IA 2 STA. 1457+54.50, LT. 32.00'
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 19 OF 24 FILE NO. 31911 DESIGN NO. 720

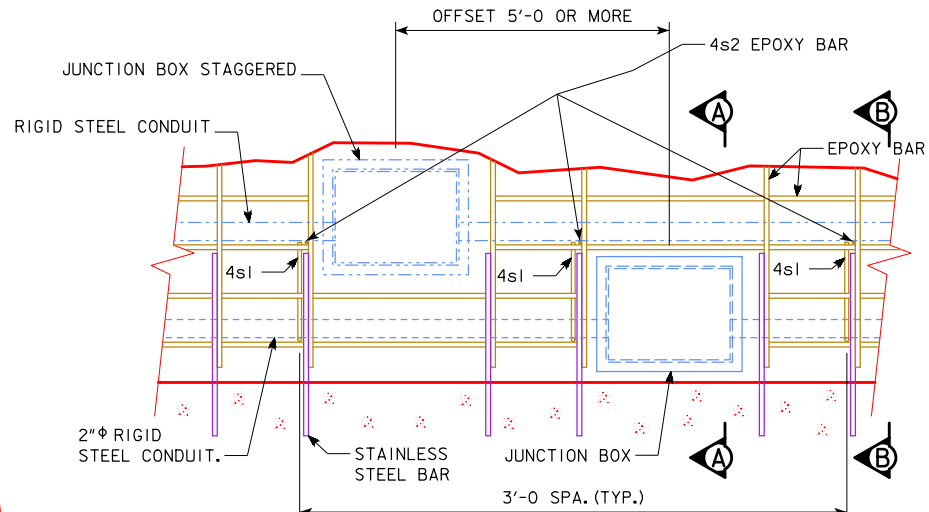
REVISED 09-2016 - ADDED CONDUIT SUPPORT RAIL DETAIL TO KEEP CONDUIT ISOLATED FROM THE STAINLESS STEEL REINFORCING.



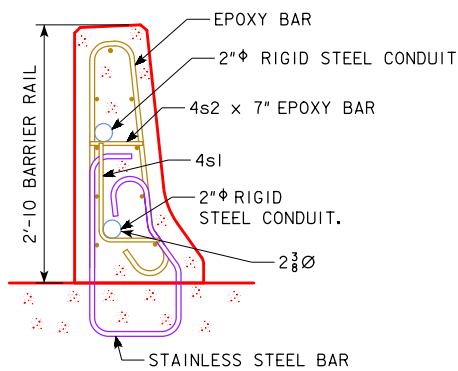
EXTERIOR ELEVATION - NORTH BARRIER RAIL - LOOKING SOUTH

I.T.S. CONDUIT NOTES:

I.T.S. CONDUIT SHALL BE LIMITED TO SIX 45° ELBOW BENDS FOR A CABLE PULL FROM HANDHOLE TO HANDHOLE.
RIGID STEEL CONDUIT FOR I.T.S. APPLICATIONS SHALL BE INSTALLED AND PREPARED TO FACILITATE INSTALLATION OF FIBER OPTIC CABLE.
THE MINIMUM INSIDE BEND RADIUS FOR RIGID STEEL CONDUIT USED FOR I.T.S. APPLICATIONS SHALL BE 18".
RIGID STEEL CONDUIT FOR I.T.S. APPLICATIONS SHALL BE CUT AND THREADED TO ELIMINATE EXPOSED THREADS AFTER COMPLETING THE CONNECTIONS; ALL COUPLINGS SHALL BE TIGHTENED UNTIL THE CONDUIT ENDS MEET TO ALLOW A CONTINUOUS INNER SURFACE THROUGHOUT THE ENTIRE LENGTH OF THE CONDUIT RUN. NIPPLES SHOULD BE USED TO ELIMINATE CUTTING AND THREADING SHORT LENGTHS OF CONDUIT.
ALL BURRS AND ROUGHENED SURFACES SHALL BE REMOVED FROM CONDUITS AND FITTINGS. ALL CONDUIT RUNS SHALL BE REAMED, CLEANED AND SWABBED FOR INSTALLATION OF FIBER OPTIC CABLE.
ONLY GALVANIZED FITTINGS SHALL BE USED WITH RIGID STEEL CONDUIT. DAMAGED GALVANIZED SURFACES OF RIGID STEEL CONDUIT OR FITTINGS SHALL BE PAINTED WITH AN ACCEPTABLE ZINC-RICH PAINT.
I.T.S. CONDUIT SHALL INCLUDE A POLYPROPYLENE PULL ROPE BETWEEN HANDHOLES WITH A MINIMUM 600 POUND TENSILE STRENGTH.
I.T.S. RIGID STEEL CONDUIT, PULL ROPES AND FITTINGS, INCLUDING LABOR AND ANY ADDITIONAL WORK FOR INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.



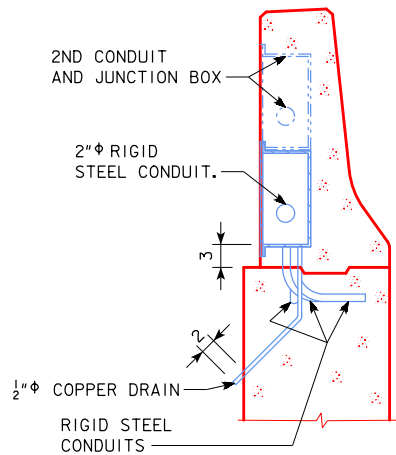
CONDUIT SUPPORT - RAIL ELEV. DETAIL
TWO JUNCTION BOX DETAIL - ADJUST REINFORCING TO CLEAR JUNCTION BOX.



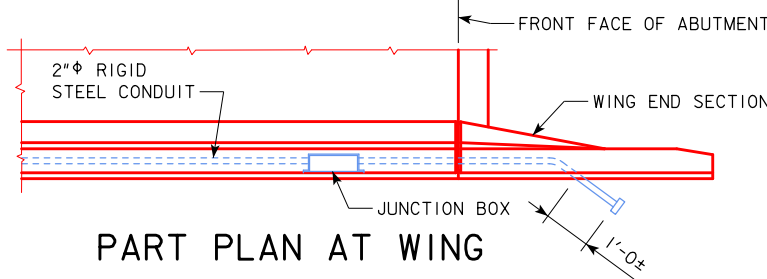
SECTION B-B - CONDUIT SUPPORT

ONLY USED IN RAIL WITH CONDUIT, USE 3'-0" SPACING. GALVANIZED CONDUIT SHALL NOT COME INTO CONTACT WITH THE STAINLESS STEEL REINFORCING. LOWER CONDUIT CAN ONLY BE 2" DIAMETER.

(70 REQUIRED)



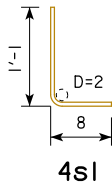
SECTION A-A THRU JUNCTION BOX



PART PLAN AT WING

EPOXY REINFORCING STEEL-SOUTH RAIL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4s1	RAIL CONDUIT	—	70	1'-9	82
4s2	RAIL CONDUIT	—	70	7	27
TOTAL WEIGHT (LBS.)					109

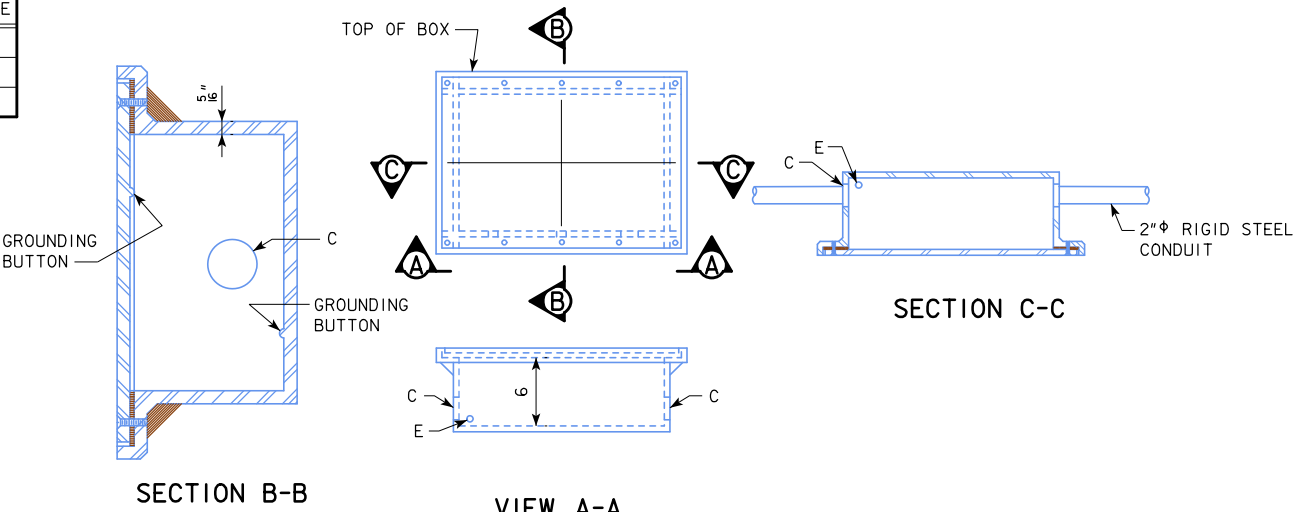


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

DESIGN FOR 0° SKEW
209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE
45'-6 END SPANS 59'-0 INTERIOR SPANS
CONDUIT DETAILS
IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 20 OF 24 FILE NO. 31911 DESIGN NO. 720

BOSSSED FOR	HOLE	FOR CONDUIT SIZE
5 THREADS	C	2" ϕ RIGID STEEL
NONE	E	1/2" ϕ COPPER PIPE

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



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.

EXPANSION FITTING SHALL BE AS SPECIFIED OR AS APPROVED BY THE ENGINEER. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.

STAINLESS-STEEL REINFORCEMENT SHALL NOT BE ALLOWED TO BE IN CONTACT WITH THE UNCOATED REINFORCEMENT, BARE METAL FORMING HARDWARE, OR TO GALVANIZED ATTACHMENTS OR GALVANIZED CONDUIT.

DESIGN FOR 0° SKEW

209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE

45'-6 END SPANS
59'-0 INTERIOR SPANS

CONDUIT DETAILS

IA 2 STA. 1457+54.50, LT. 32.00'

MAY 2020

FREMONT COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 21 OF 24 FILE NO. 31911 DESIGN NO. 720

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 IT'S 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).

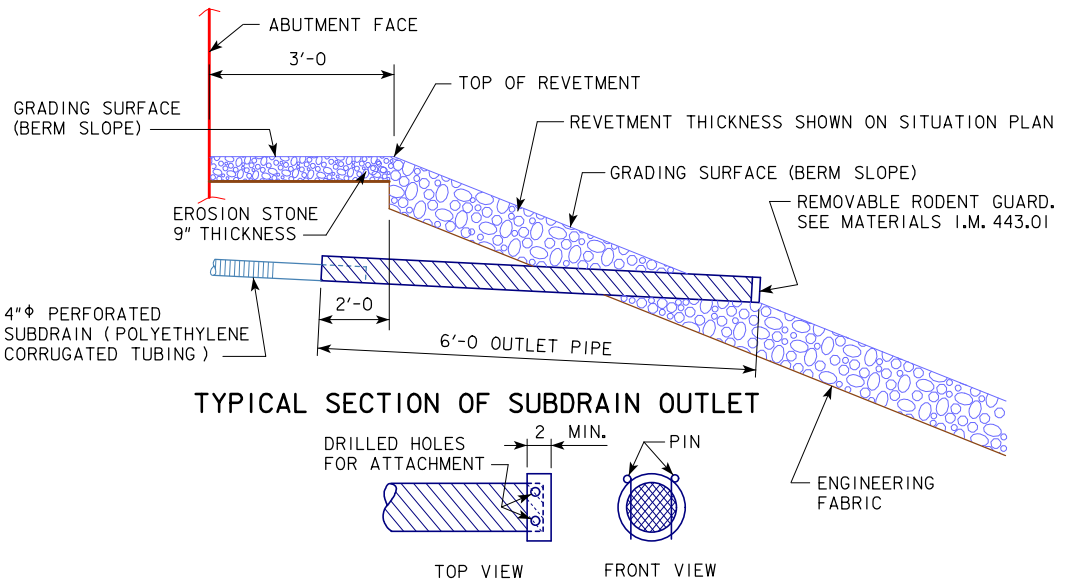
2. INSERT 1'-0 OF THE 4"Φ SUBDRAIN INTO THE 6"Φ METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

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 BERM. 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
EAST ABUTMENT	920.3±
WEST ABUTMENT	919.8±



TYPICAL SECTION OF SUBDRAIN OUTLET

REMOVABLE RODENT GUARD DETAILS

REVETMENT STONE (EMBEDDED) OUTLET DETAILS

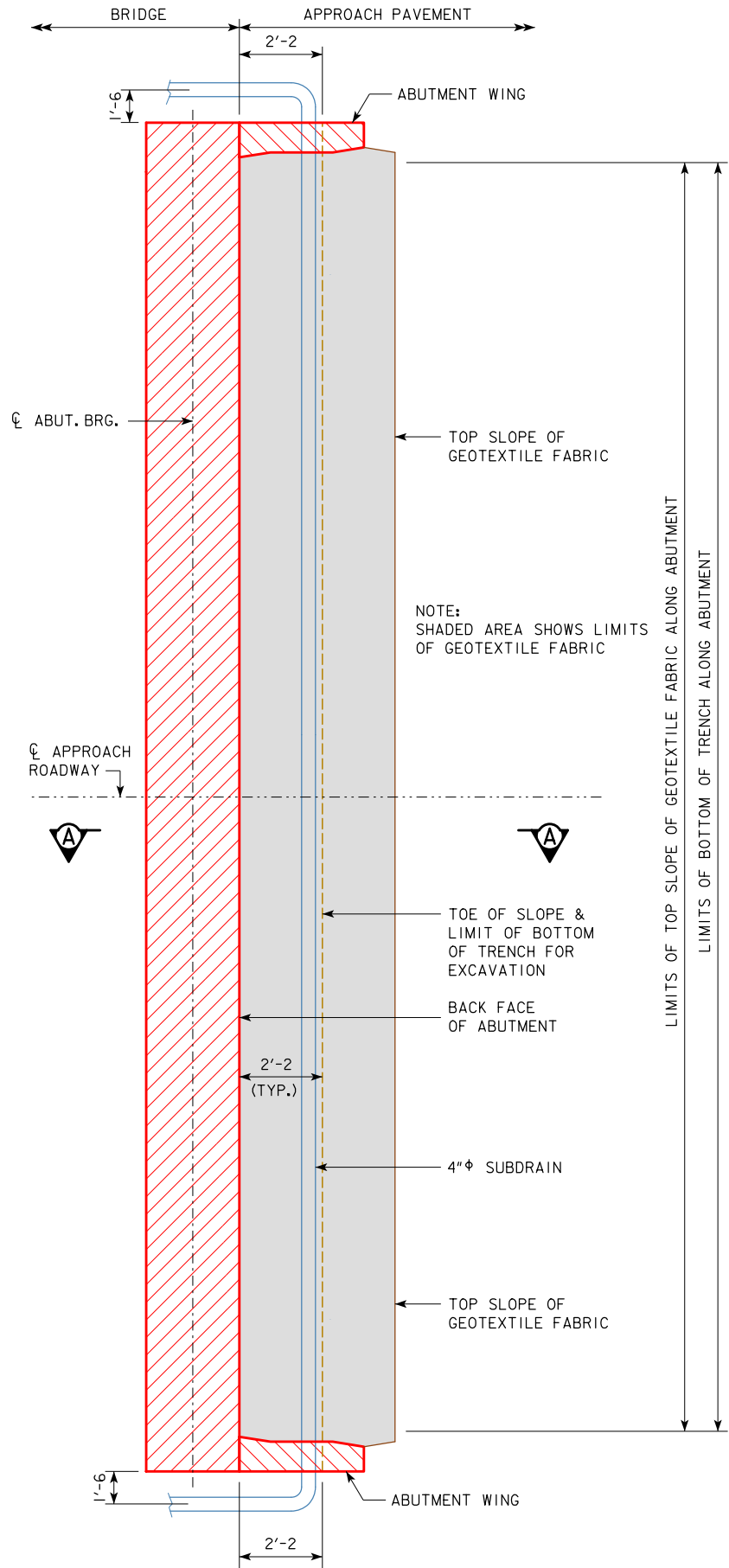
NOTE:
SECTION A-A IS SHOWN ON ABUTMENT
BACKFILL DETAILS SHEET.

SITUATION PLAN
SHOWING SUBDRAIN LOCATIONS

DESIGN FOR 0° SKEW
**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**
45'-6 END SPANS 59'-0 INTERIOR SPANS
SUBDRAIN DETAILS
IA 2 STA. 1457+54.50, LT. 32.00'
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 22 OF 24 FILE NO. 31911 DESIGN NO. 720

REVISED 07-11 - THE BERM SLOPE IS IDENTIFIED AS THE GRADING SURFACE.

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND IS LOCATED IN THE STANDARD SPECIFICATIONS. CHANGED SURFACE FLOODING TIME TO 5 MINUTE INCREMENTS.
REVISED 09-2016 - CHANGED THE BRIDGE APPROACH PAVEMENT STANDARD TO "BR" (WAS "RK").
ENGLISHFORSLOPEPROTECTIONBRIDGES.DGN - 1007D - THIS SHEET ISSUED 08-07.



ABUTMENT PLAN

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.

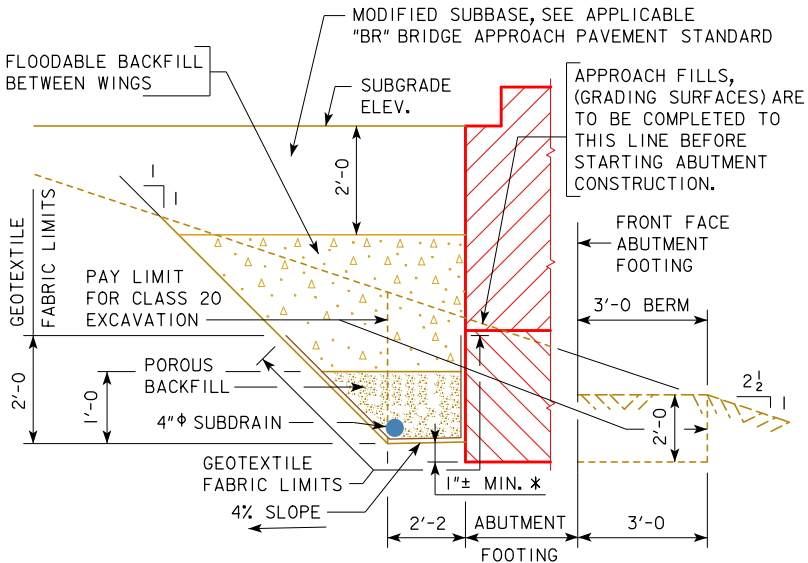
THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

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

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM ϕ APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

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.

DESIGN FOR 0° SKEW
209'-0 X 40'-0 CONTINUOUS CONCRETE SLAB W.B. BRIDGE
45'-6 END SPANS 59'-0 INTERIOR SPANS
ABUTMENT BACKFILL DETAILS
IA 2 STA. 1457+54.50, LT. 32.00' MAY 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 23 OF 24 FILE NO. 31911 DESIGN NO. 720

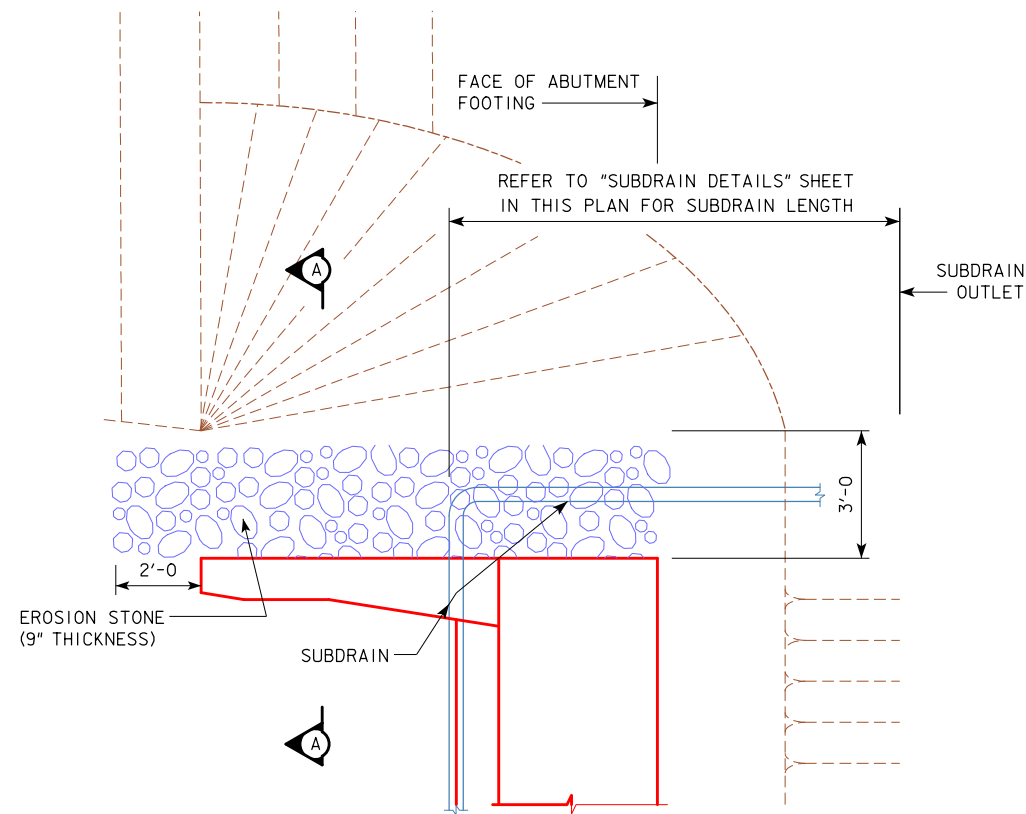
BRIDGE WING ARMORING NOTES:

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 UNDERLAYED WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

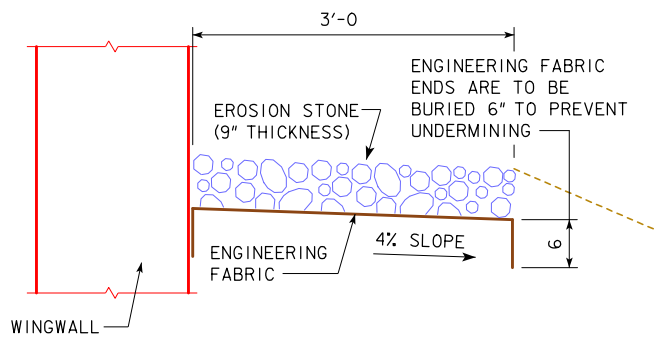
THE EROSION STONE SHALL BE IN ACCORDANCE WITH SECTION 4130, OF THE STANDARD SPECIFICATIONS. MATERIAL PASSING THE 3 INCH SCREEN BUT 100% RETAINED ON A 1 INCH SCREEN MAY BE USED AS CHOKE STONE.

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.

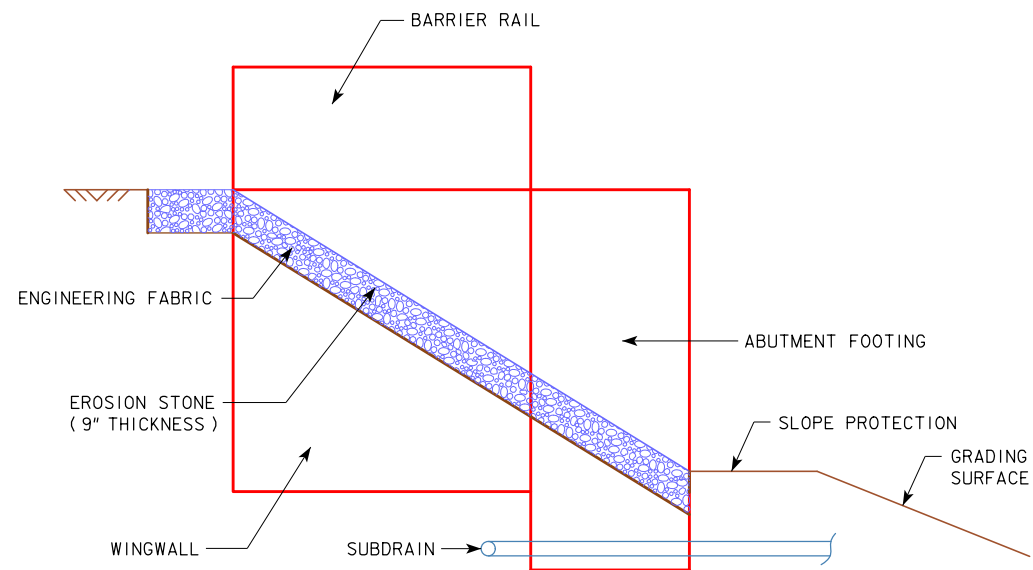
PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, EROSION STONE, EXCAVATION, SHAPING, AND COMPACTION TO DIMENSIONS SHOWN IN THESE PLANS. BID ITEM SHALL BE "BRIDGE WING ARMORING - EROSION STONE".



TOP VIEW OF WING ARMORING

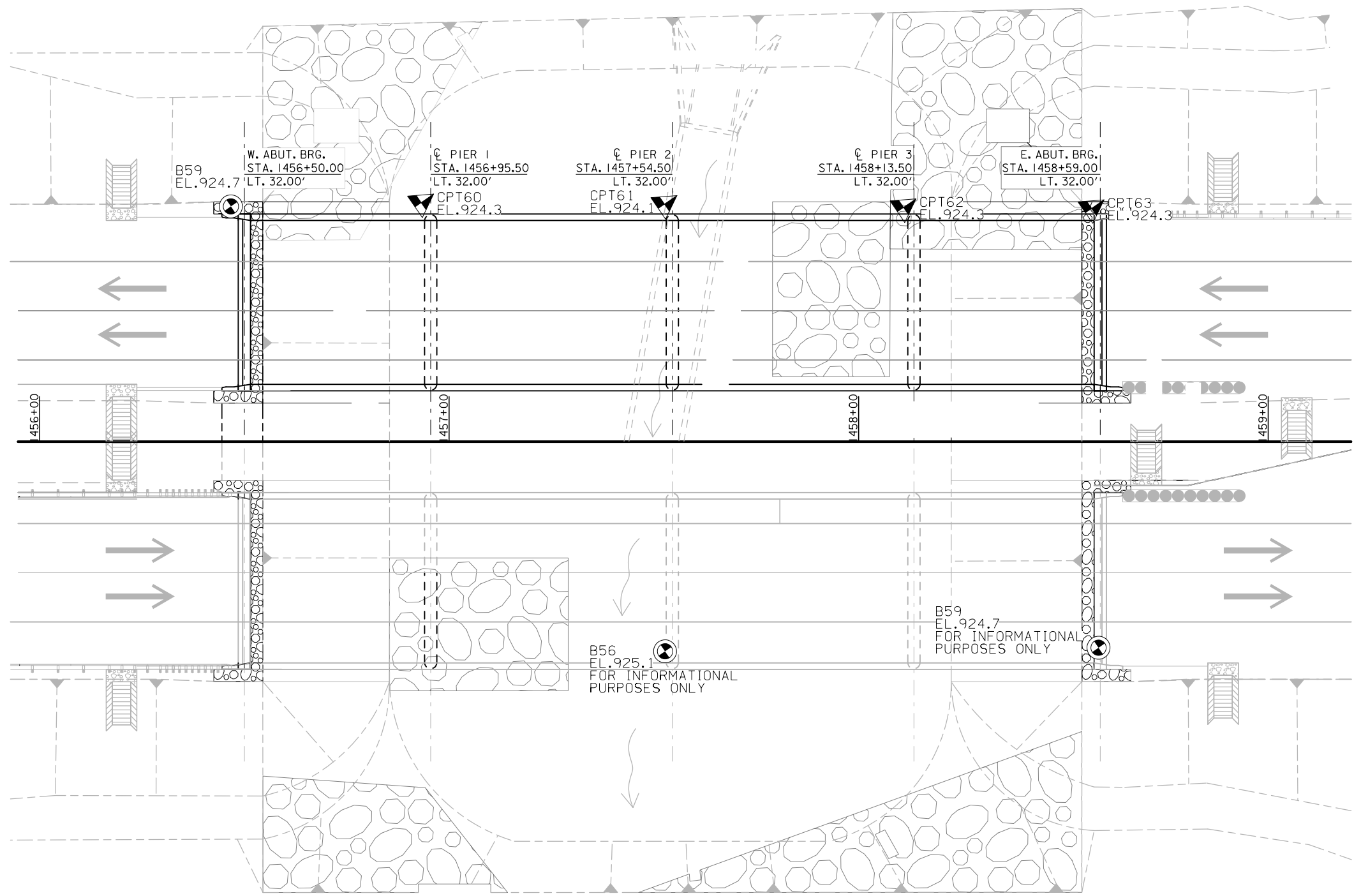


SECTION A-A



PROFILE VIEW OF WING ARMORING

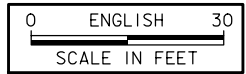
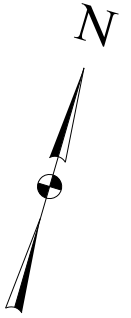
DESIGN FOR 0° SKEW
209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE
45'-6 END SPANS 59'-0 INTERIOR SPANS
BRIDGE WING ARMORING
1A 2 STA. 1457+54.50, LT. 32.00' MAY 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 24 OF 24 FILE NO. 31911 DESIGN NO. 720



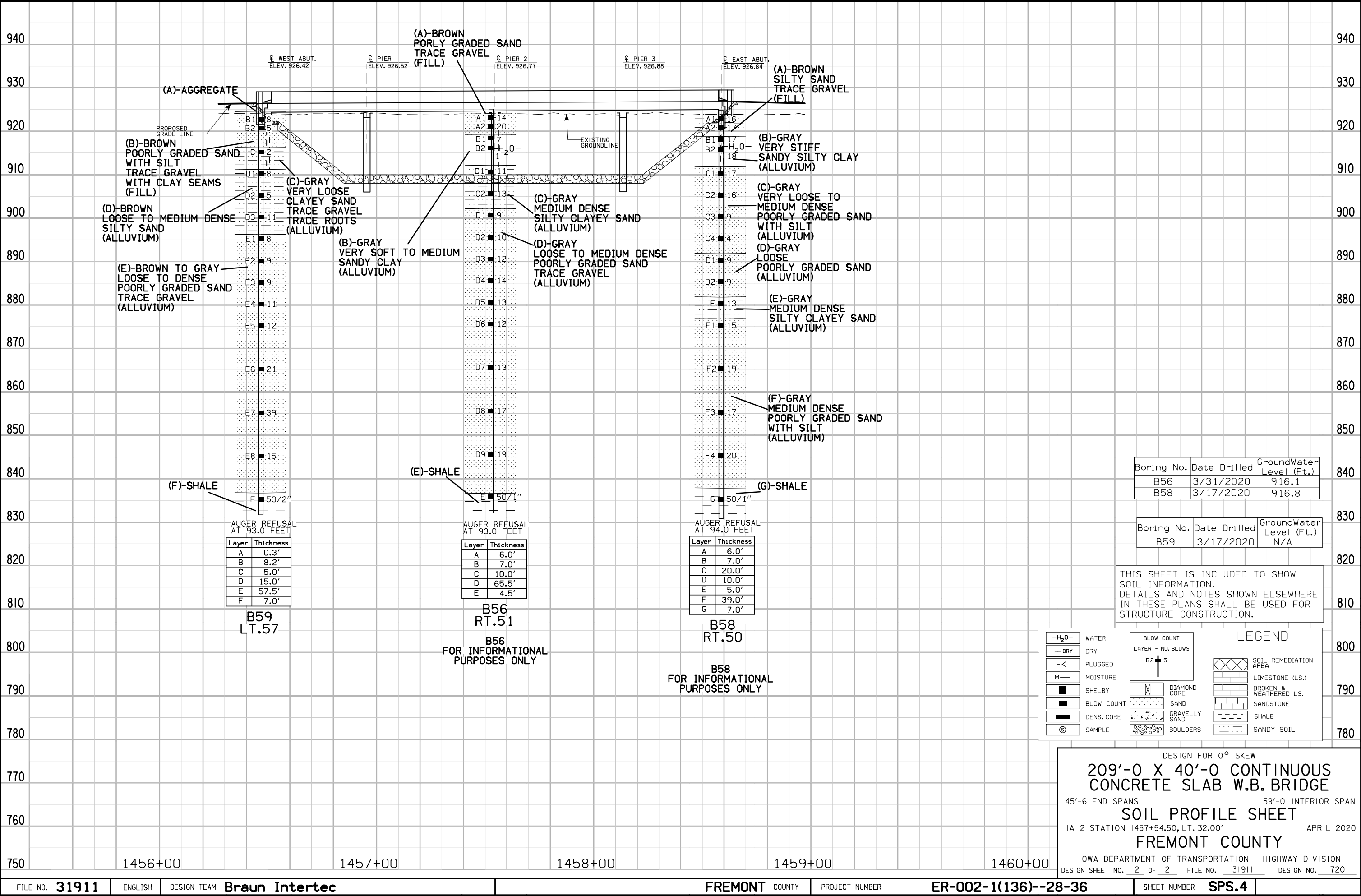
THIS SHEET IS INCLUDED TO SHOW
SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE
IN THESE PLANS SHALL BE USED FOR
STRUCTURE CONSTRUCTION.

LOCATION

IA 2 OVERFLOW
T-68N R-43W
SECTION 30
BENTON TOWNSHIP
FREMONT COUNTY
FHWA NO. 701120
BRIDGE MAINT. NO. 3601.8L002
LATITUDE 40.688522°
LONGITUDE -95.811972°



DESIGN FOR 0° SKEW
**209'-0 X 40'-0 CONTINUOUS
CONCRETE SLAB W.B. BRIDGE**
45'-6 END SPANS 59'-0 INTERIOR SPAN
SOIL PROFILE SHEET
IA 2 STATION 1457+54.50, LT. 32.00' APRIL 2020
FREMONT COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 2 FILE NO. 31911 DESIGN NO. 720



100-1A
07-15-97

	100-4#
	10-29-02

100-4A
10-29-02

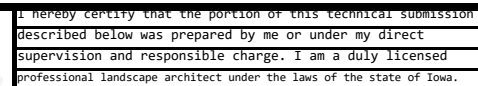
	105- 10-18-1
--	-----------------

105-
10-18-1

[illegible]

111-25
10-18-11

ROADWAY DESIGN



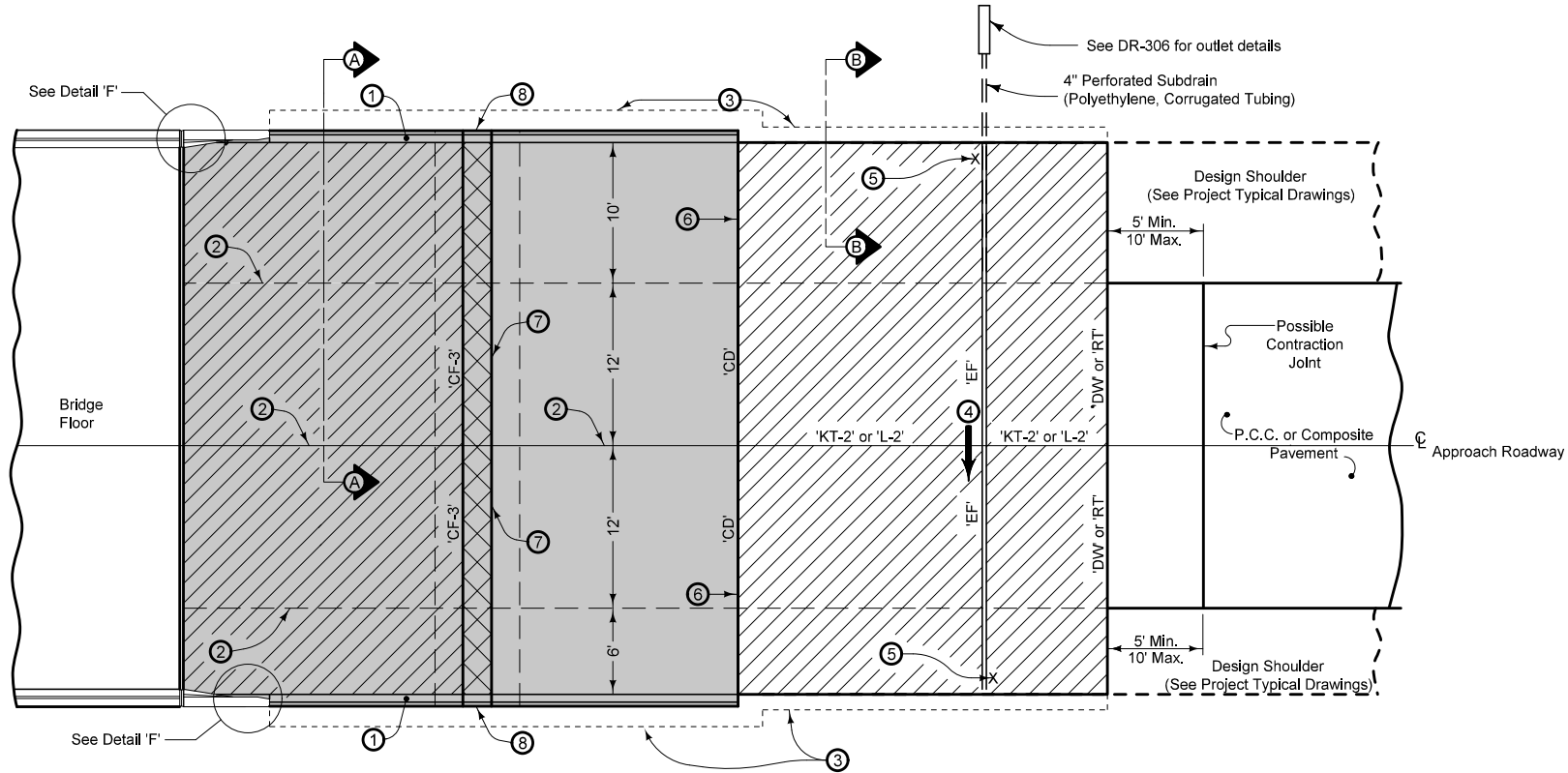
Kelly C. Bell

Printed or Typed Name

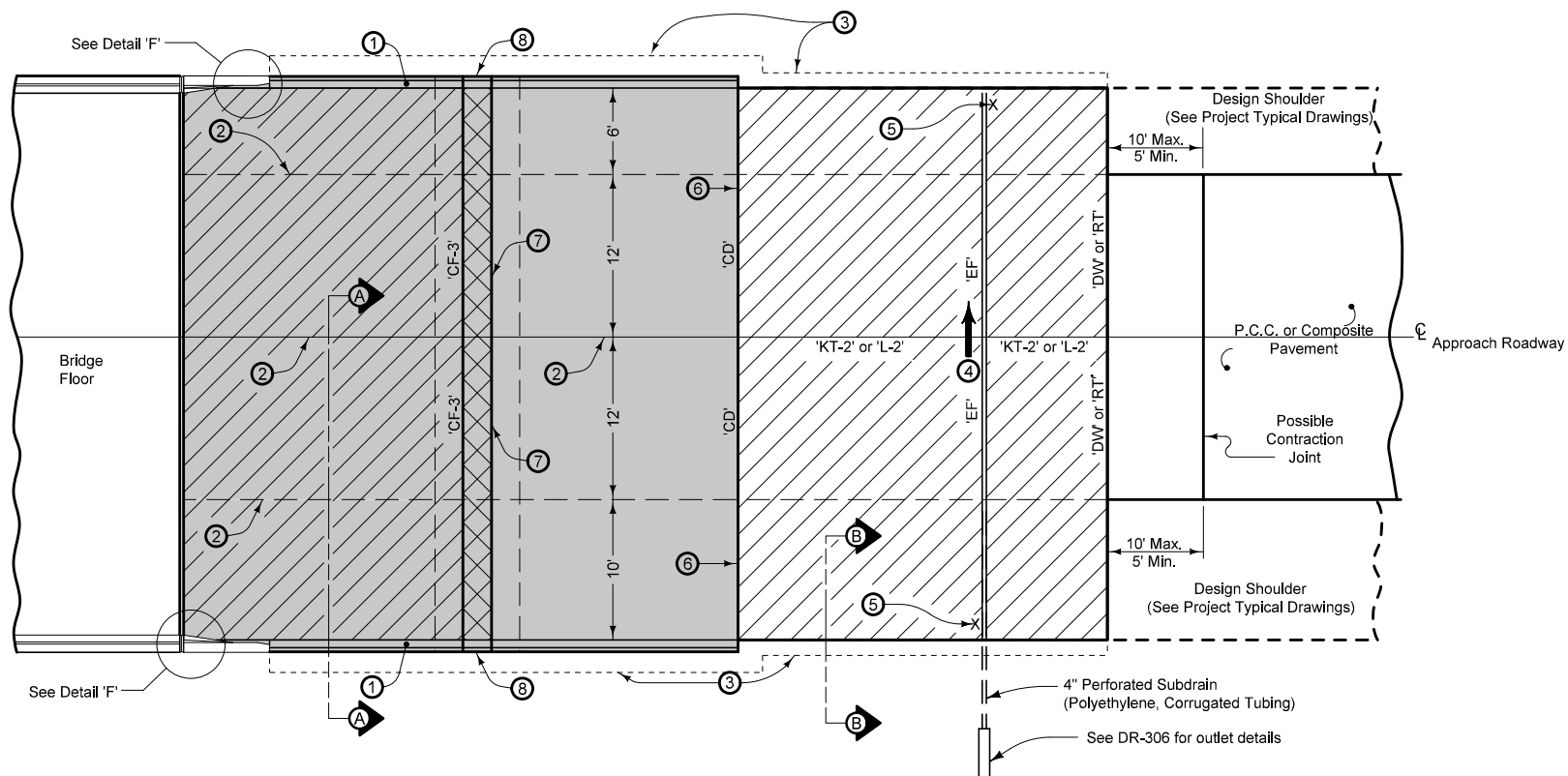
My license renewal date is Dec. 31, 2021

Pages or sheets covered by this seal: C.1-C.2, U.1-U.6

PLAN VIEW



IA 2



Pay limits for contract item include the following areas:

- Double Reinforced Section
- Sleeper Beam Section
- Single Reinforced Section
- Non-Reinforced Section

For joint details, see PV-101.

For curb details, see Detail 'G'.

All transverse bars are #5.

Use epoxy coated bars for all reinforcement.

Quantities for both the 1'-9" top part of the sleeper slab and the 6'-3" portion under the approach pavement have been included in the double reinforced section quantities.

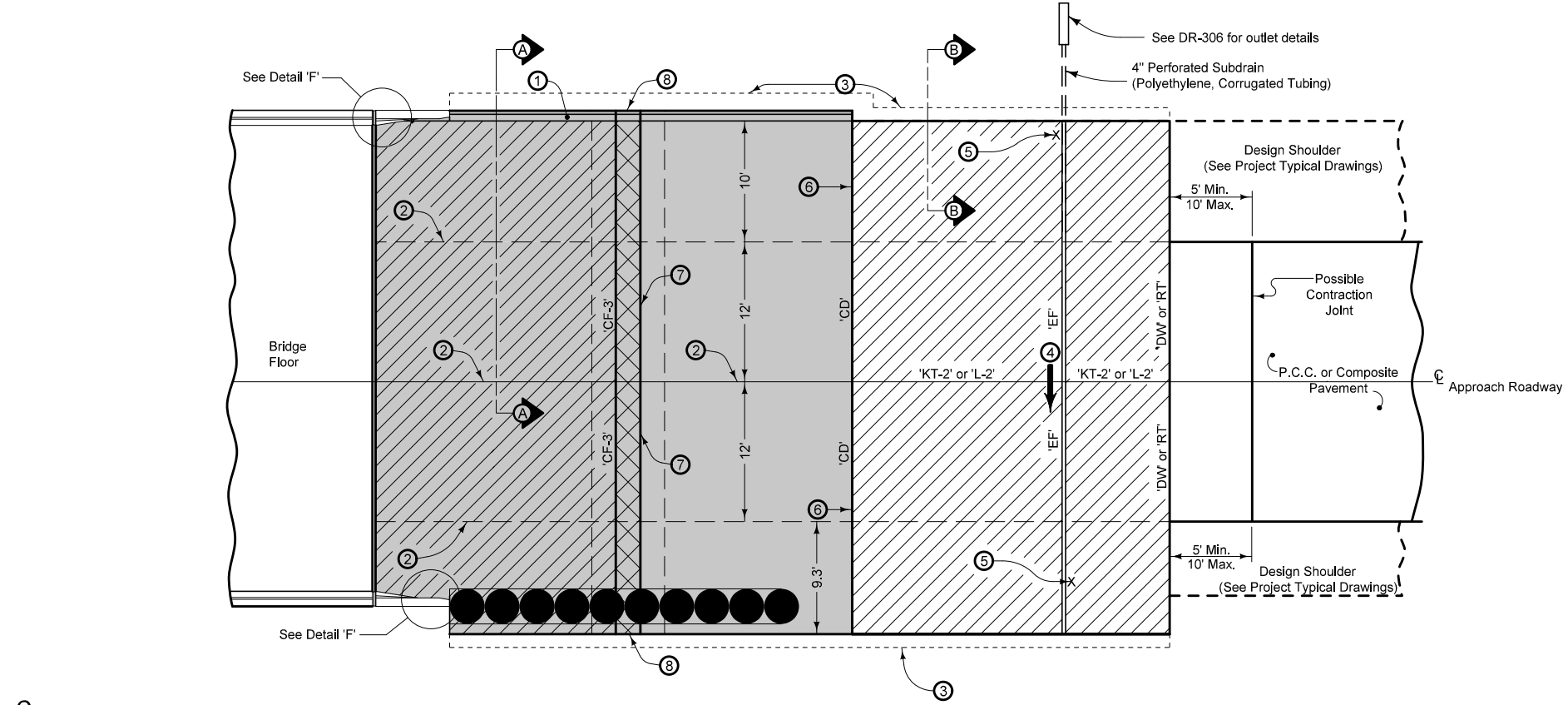
- Build 4 inch Sloped Curb to end of Reinforced Sections.
- Longitudinal Joint (PV-101):
Single Pour - Saw cut joint per Detail B.
Two Pours - Use 'KS-1' joint (Single Reinforced Section).
Use 'KS-2' joint (Double Reinforced Section).
- Polymer Grid and excavation limits of Modified Subbase 2 feet outside of pavement edge.
- Slope subdrain to drain.
- Place an "X" in the plastic concrete near the 'EF' joint at the outside edge of pavement.
- Place 'RD' Joint where PCC shoulder. Place 'B' joint otherwise.
- $\frac{1}{4}$ inch Preformed Joint Filler and seal top.
- See Detail 'C'.

Possible Contract Item:
Bridge Approach, BR-205

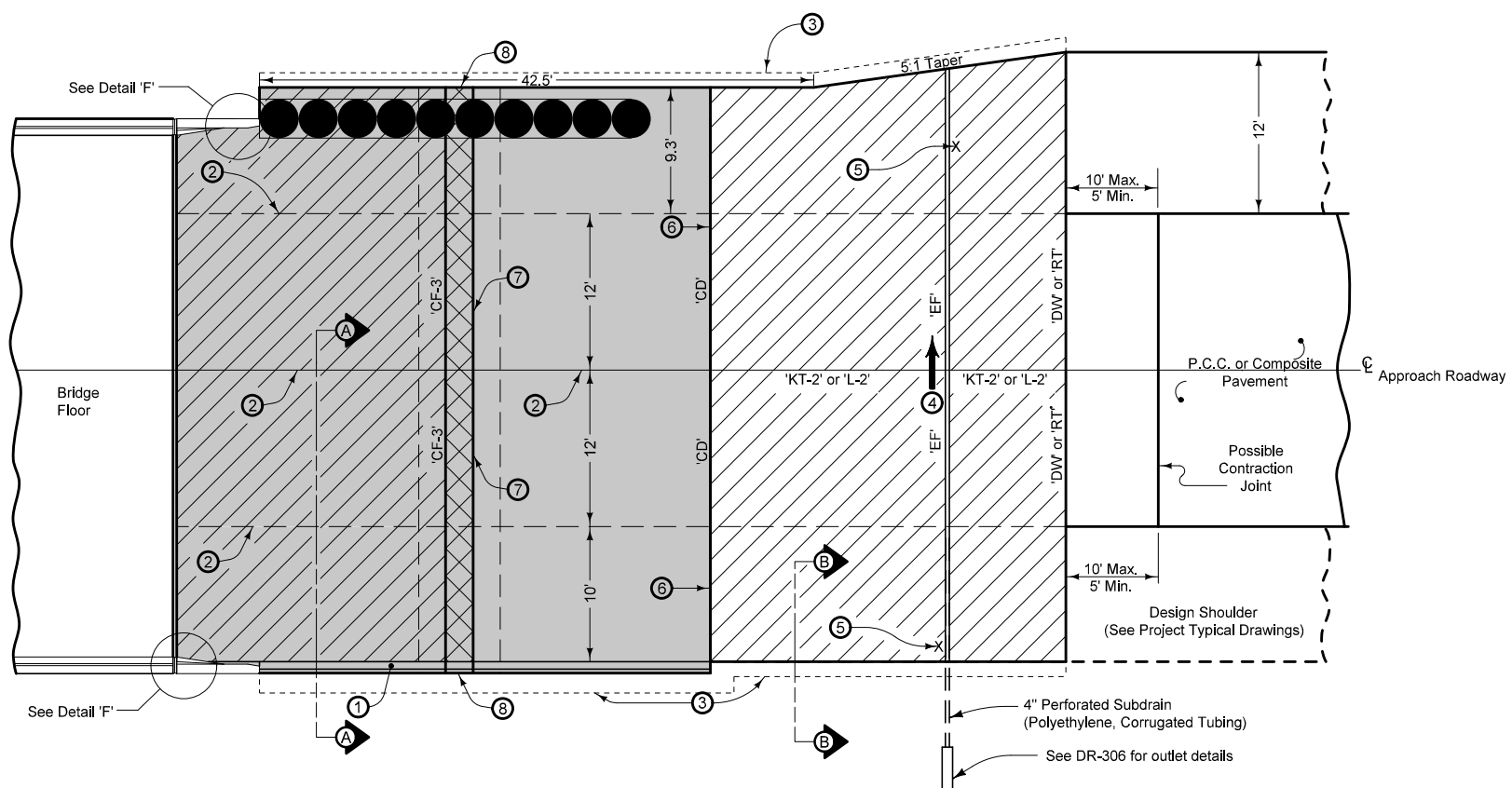
Possible Tabulation:
112-6

MODIFIED STANDARD ROAD PLAN	BR-205M
	SHEET 1 of 5
DOUBLE REINFORCED 12" APPROACH (SLAB BRIDGE ABUTTING PCC NO SKEW)	

PLAN VIEW



IA 2



For joint details, see PV-101.

For curb details, see Detail 'G'.

All transverse bars are #5.

Use epoxy coated bars for all reinforcement.

Quantities for both the 1'-9" top part of the sleeper slab and the 6'-3" portion under the approach pavement have been included in the double reinforced section quantities.

- ① Build 4 inch Sloped Curb to end of Reinforced Sections.
- ② Longitudinal Joint (PV-101):
Single Pour - Saw cut joint per Detail B.
Two Pours - Use 'KS-1' joint (Single Reinforced Section).
Use 'KS-2' joint (Double Reinforced Section).
- ③ Polymer Grid and excavation limits of Modified Subbase 2 feet outside of pavement edge.
- ④ Slope subdrain to drain.
- ⑤ Place an "X" in the plastic concrete near the 'EF' joint at the outside edge of pavement.
- ⑥ Place 'RD' Joint where PCC shoulder. Place 'B' joint otherwise.
- ⑦ $\frac{1}{4}$ inch Preformed Joint Filler and seal top.
- ⑧ See Detail 'C'.

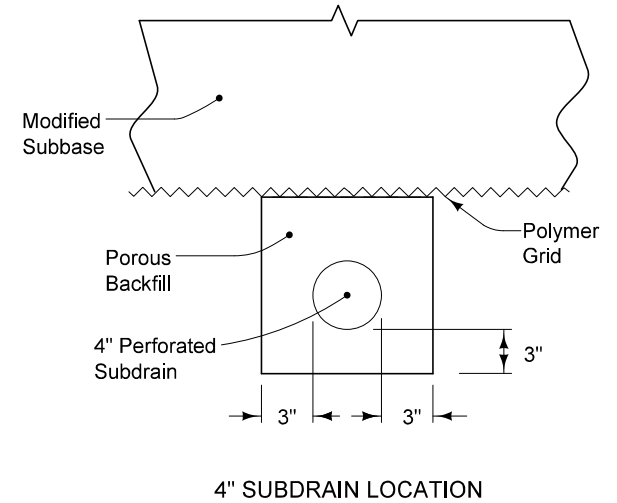
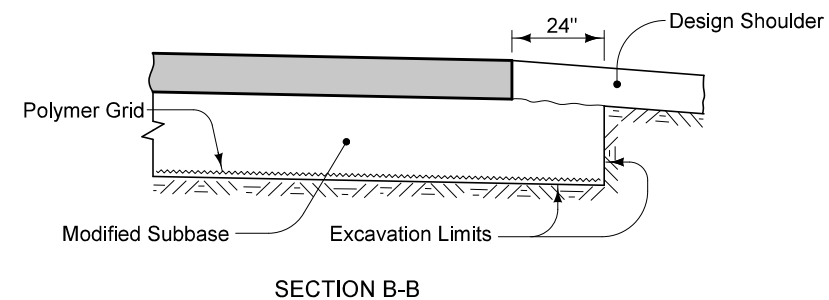
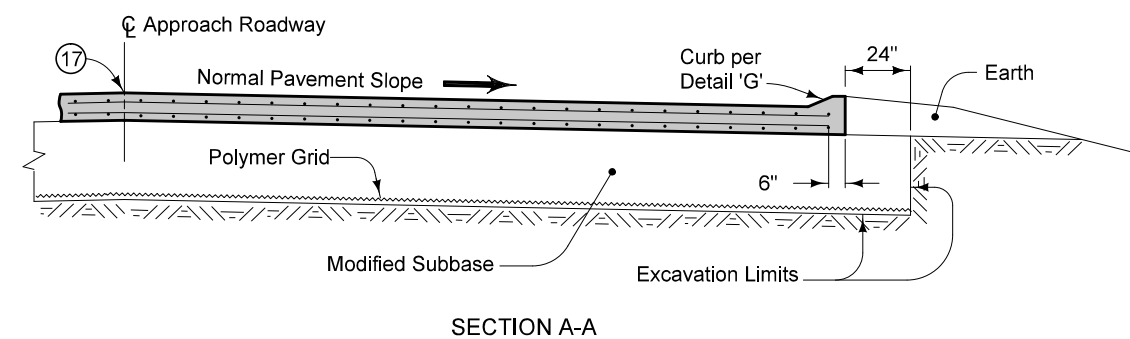
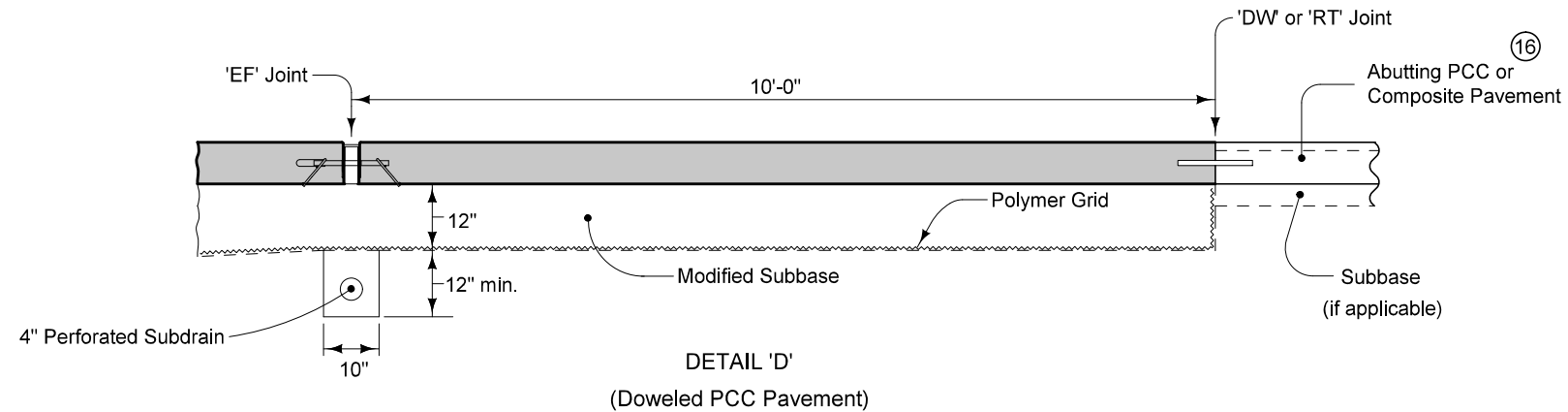
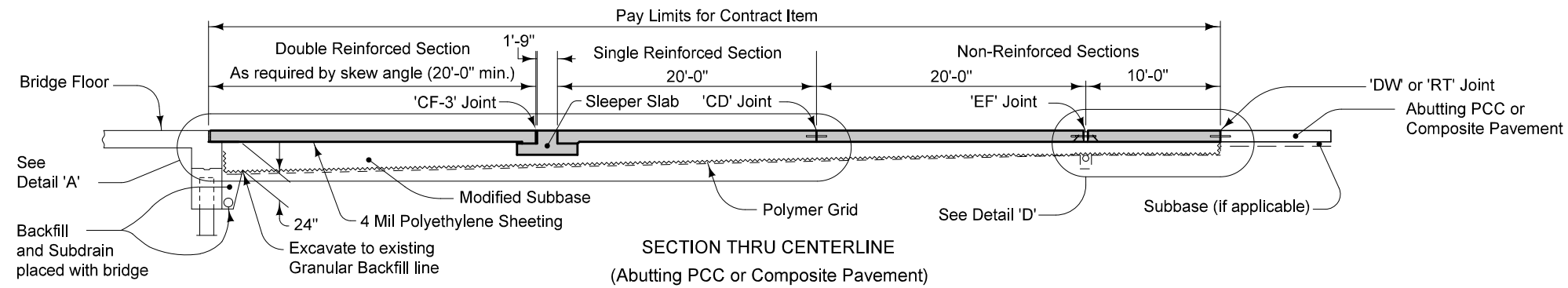
Possible Contract Item:
Bridge Approach, BR-205

Possible Tabulation:
112-6

Pay limits for contract item include the following areas:

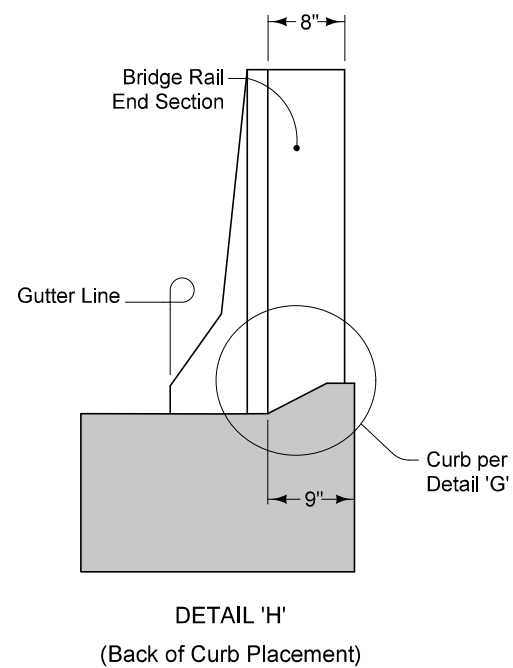
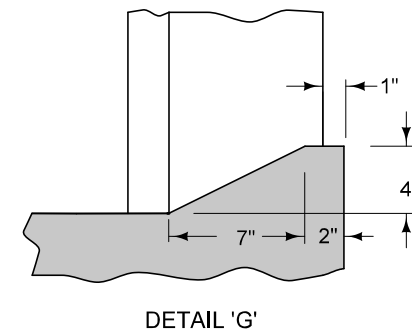
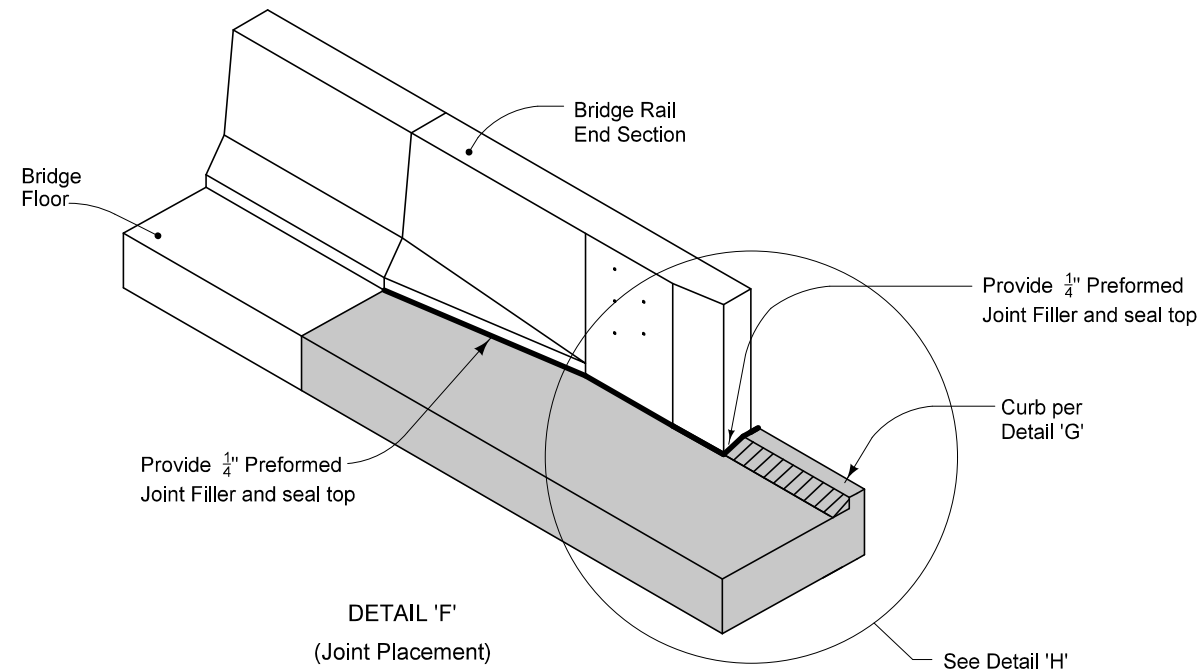
	Double Reinforced Section
	Sleeper Beam Section
	Single Reinforced Section
	Non-Reinforced Section

MODIFIED STANDARD ROAD PLAN	BR-205M
	SHEET 2 of 5
DOUBLE REINFORCED 12" APPROACH (SLAB BRIDGE ABUTTING PCC NO SKEW WITH TURN LANE AND CRASH CUSHION)	

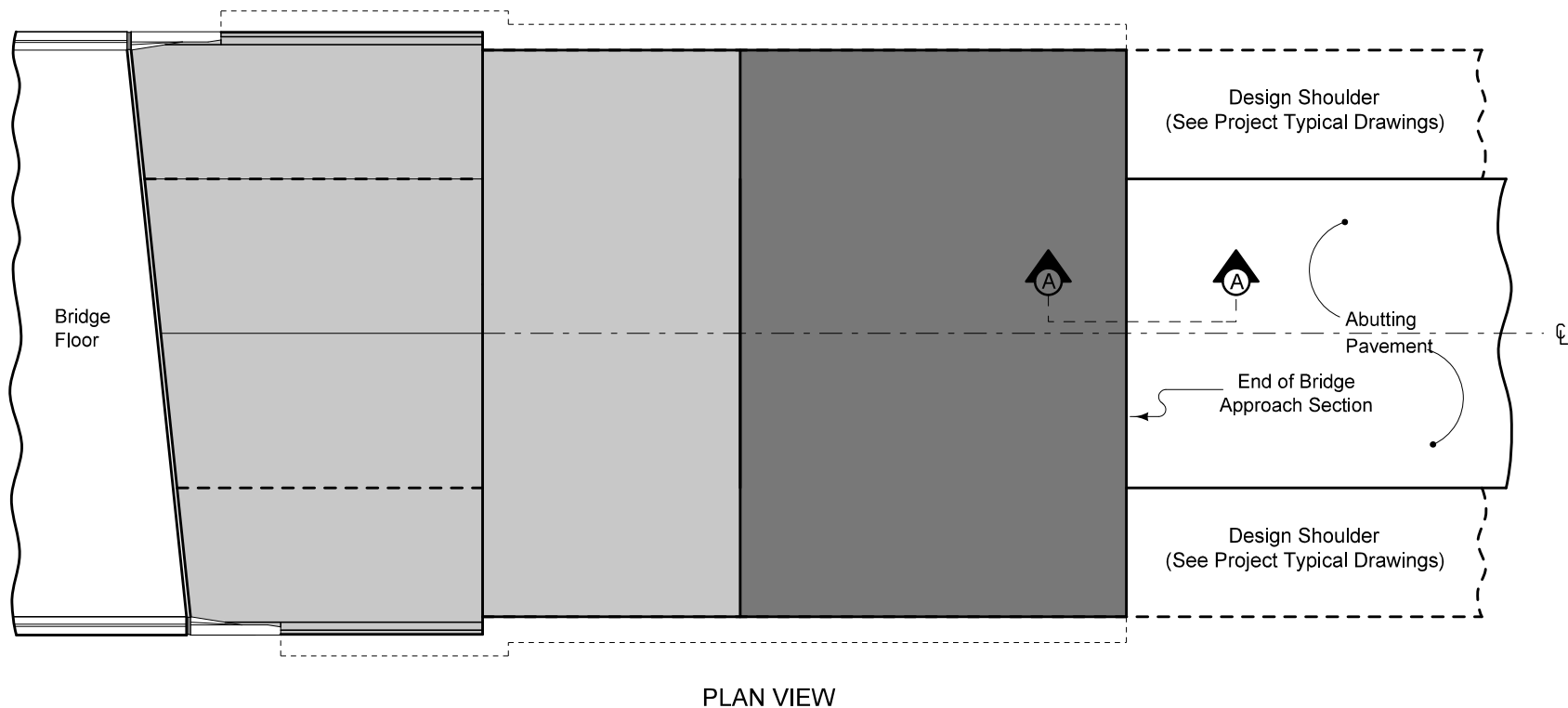
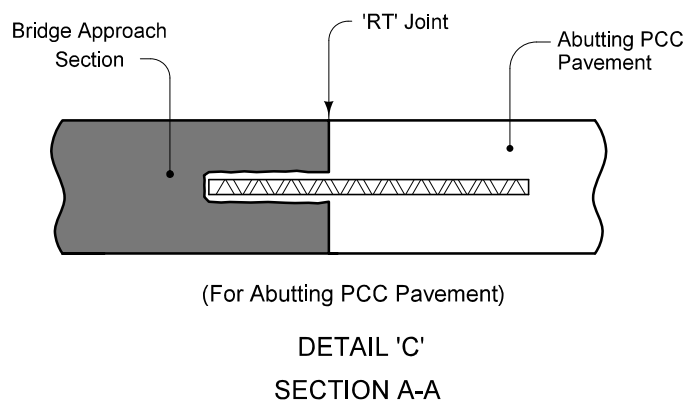
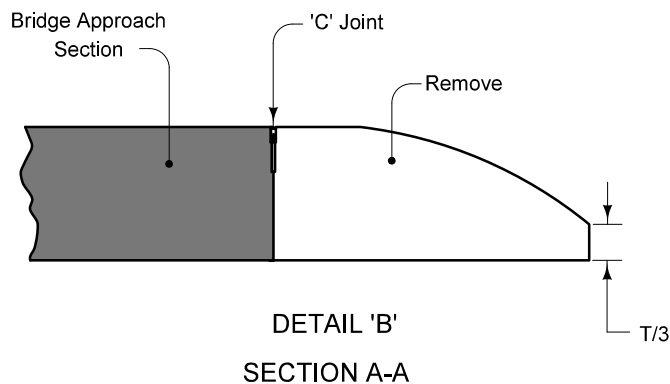
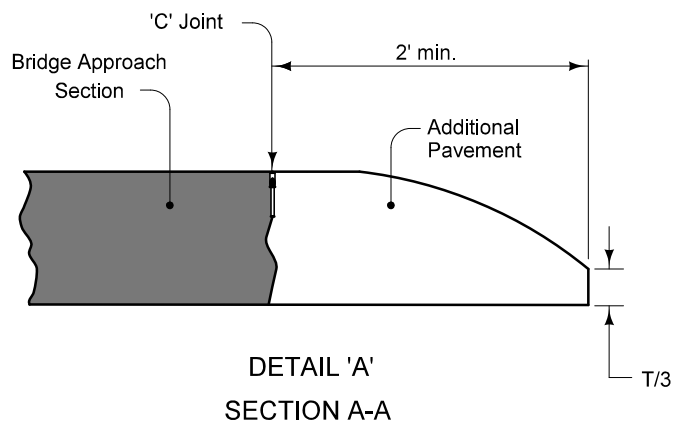


- ①⑥ If abutting pavement (PCC) is not in place, refer to BR-213M.
- ①⑦ Longitudinal Joint (PV-101):
Single Pour - Saw cut joint per Detail B.
Two Pours - Use 'KS-1' joint (Single Reinforced Section).
Use 'KS-2' joint (Double Reinforced Section).
- ①⑧ See Detail 'C'.

MODIFIED STANDARD ROAD PLAN	
	BR-205M
	SHEET 4 of 5
DOUBLE REINFORCED 12" APPROACH (SLAB BRIDGE)	



MODIFIED STANDARD ROAD PLAN	
	BR-205M
	SHEET 5 of 5
DOUBLE REINFORCED 12" APPROACH (SLAB BRIDGE)	



For Jointing Details, see PV-101.

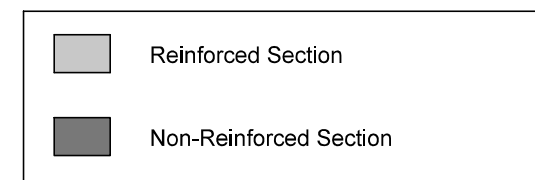
If abutting pavement (PCC or HMA) is not in place when bridge approach pavement is constructed, the following procedure applies:

1. The paving contractor of bridge the approach pavement paves Additional Pavement (as shown in Detail 'A'), constructs 'C' joint at end of bridge approach section, and leaves in this state.
2. The paving contractor of the abutting pavement saw cuts full depth at 'C' joint and removes Additional Pavement (see Detail 'B'), then
3. The paving contractor of the abutting pavement constructs 'RT' joint or 'B' joint, accordingly (see Detail 'C').

This work is incidental to other work as follows:

Detail 'A': Bridge Approach, BR-203.

Details 'B' and 'C': Standard or Slip Form PCC Pavement, or Hot Mix Asphalt Mixture.



MODIFIED		
STANDARD ROAD PLAN	BR-213M	
	SHEET 1 of 1	
BRIDGE APPROACH (ABUTTING PAVEMENT)		