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C.1	Standard Plans - Road



PLANS OF PROPOSED IMPROVEMENT ON THE

INTERSTATE ROAD SYSTEM

POLK COUNTY

Bridge Replacement - PPCB

I-80 EB over NE 29th Street
0.7 MI. E of NE I-35/235 Interchange (EB)

Refer to the Plan Sheets for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

Revisions

	TOTAL
	58
PROJECT IDENTIFICATION NUMBER	
10-77-035-010-05	
CONTRACT ID NUMBER	
PROJECT NUMBER	
IM-NHS-080-4(087)139--03-77	
R.O.W. PROJECT NUMBER	
PROJECT DIRECTORY NUMBER	
7703501010	

Standard Road Plans

Standard Road Plans are listed on Sheet Number C.1.

Design Data Urban			
(NE 29th St.)			
2024 AADT	3,840	V,P,D.	
2040 AADT	3,900	V,P,D.	
2040 DHV	490	V,P,H.	
TRUCKS	11	%	
Total Design ESALs	-		

Design Data Urban			
(I-80 E.B.)			
2024 AADT	48,946	V,P,D.	
2044 AADT	60,270	V,P,D.	
2044 DHV	6,230	V,P,H.	
TRUCKS	17	%	
Total Design ESALs	-		

Index Of Seals		
Sheet No.	Name	Type
A.1	Dusten L. Olds	Structural Design
SPS.1	Brian T. Havens	Geotechnical Design
A.3	Benett J. Batenhorst	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

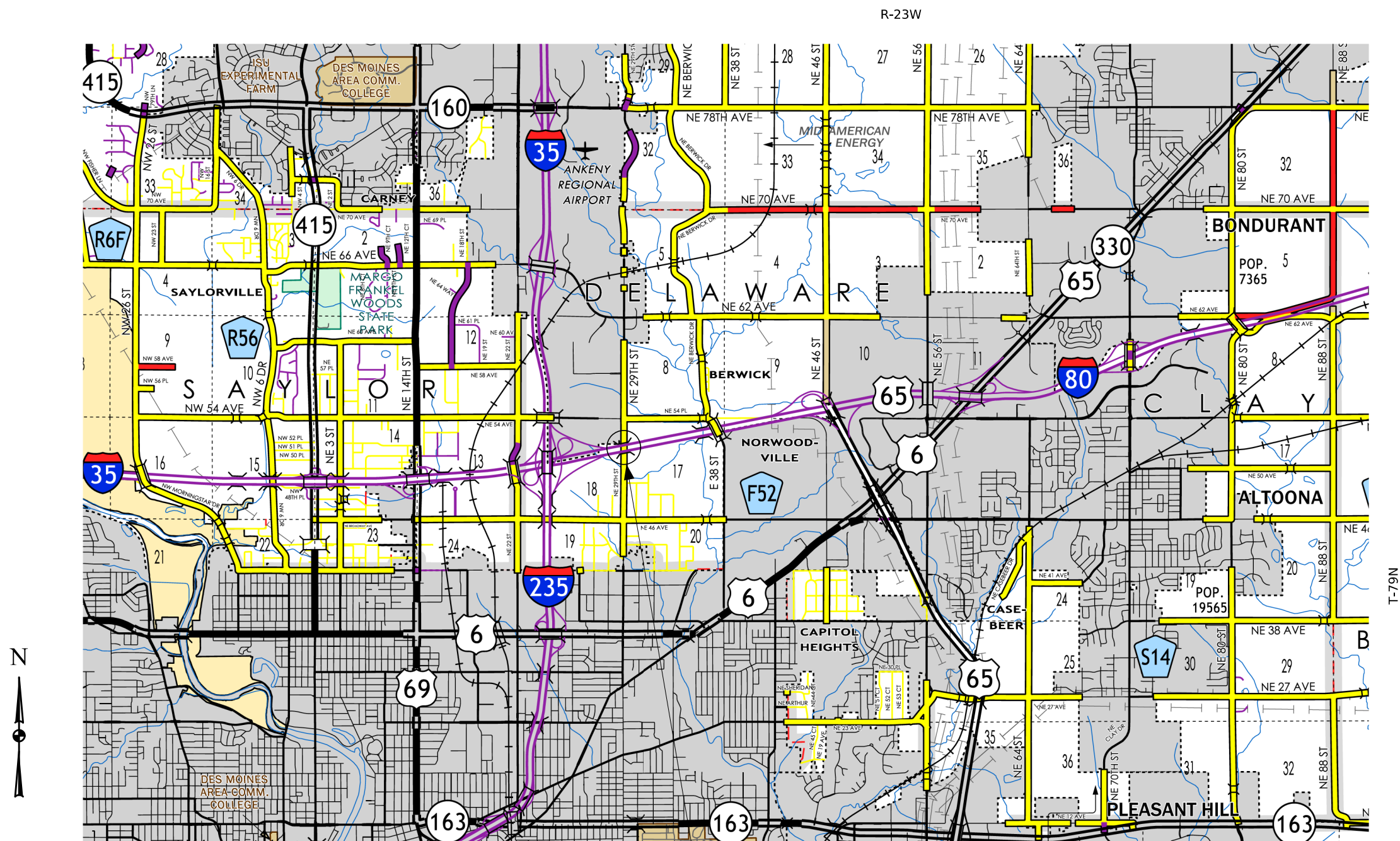
Printed or Typed Name

Dusten L. Olds

My license renewal date is December 31,

2026

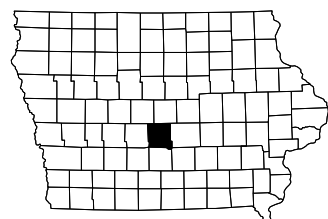
Pages or sheets covered by this seal: Sheets A.1, A.2, V.1 Thru V.41



Design No. 226
FHWA No. 041951

Polk County Location Map

Not To Scale



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

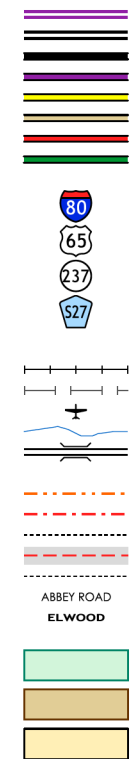
RAILROAD
PIPELINE
AIRPORT
HYDROLOGY
BRIDGE

STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE BOUNDARY
TOWNSHIP LINE
SECTION LINE
ROAD NAMES
UNINCORPORATED PLACE

STATE PARKS

STATE INSTITUTIONS

FEDERAL LAND



Estimated Bridge Quantities					
Item No.	Item Code	Item	Unit	Total	As Built Quantity
1	2401-6745625	Removal of Existing Bridge	LS	1.0	
2	2402-2720000	Excavation, Class 20	CY	1,045	
3	2403-0100010	Structural Concrete (Bridge)	CY	524.2	
4	2403-1000005	Fiber Reinforcement for Structural Concrete	CY	614.5	
5	2403-1000010	Trial Batch and Test Placement (Fiber Reinforced Concrete)	LS	1.0	
6	2403-7000210	High Performance Structural Concrete	CY	614.5	
7	2404-7775000	Reinforcing Steel	LB	85,426	
8	2404-7775005	Reinforcing Steel, Epoxy Coated	LB	183,858	
9	2404-7775009	Reinforcing Steel, Stainless Steel	LB	5,525	
10	2407-0562850	Beam, PPC, BTB50	EACH	9	
11	2407-0562875	Beam, PPC, BTB75	EACH	9	
12	2407-0562895	Beam, PPC, BTB95	EACH	9	
13	2408-7800000	Structural Steel	LB	9,773	
14	2414-6424038	Concrete Barrier Rail, 3'-8"	LF	482.1	
15	2501-0201057	Piles, Steel, HP 10 x 57	LF	4,795	
16	2501-6335010	Prebored Holes	LF	150	
17	2507-2638610	Concrete Slope Protection	SY	510	
18	2507-2638620	Macadam Stone Slope Protection	SY	545	
19	2507-2638660	Bridge Wing Armoring - Macadam Stone	SY	13	
20	2526-8285000	Construction Survey	LS	1.0	
21	2533-4980005	Mobilization	LS	1.0	
22	2599-9999009	Pile Casing, CMP, 24"	LF	102	
23	2599-9999010	Shoring	LS	1.0	

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Situation Plan	V.5
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Abutment Details	V.11
Superstructure Details	V.16
Beam Details	V.21
Steel Diaphragm Details	V.25
Top of Deck Elevations	V.27
Haunch Data Details	V.28
Conduit Details	V.29
Barrier Rail Details	V.30
Concrete Slope Protection	V.36
Macadam Stone Slope Protection	V.37
Bridge Wing Armoring	V.38
Subdrain Details	V.39
Abutment Backfill Details	V.40
Soil Profile Sheets	SPS.1



Item No.	Estimate Reference Information
1	Includes all work for removal and off-site disposal of the existing 280'-0" x 56'-0" PPCB E.B. Bridge (Design No. 4658) and widening plans (Design No. 1391). 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. Contractor to add the following information when submitting the Iowa DNR "Notification of Demolition" form: Name of Asbestos Inspector: Brad Azeltine Date Inspected: 6/11/2019 IA License Number: Iowa DOT Inspector Phone: 515-231-5869 Procedure used to detect the presence of asbestos materials: Polarized Light Microscopy (PLM)
3	All abutment footing and pier concrete is to be Class "C".
4	Refer to the "Developmental Specifications for Fiber Reinforcement for Structural Concrete" for additional information.
5	Includes all work and materials necessary for a trial batch and test placement of fiber reinforced concrete. Refer to the "Developmental Specifications for Fiber Reinforcement for Structural Concrete" for additional information.
6	This bid item includes the concrete for the deck, abutment diaphragms, pier diaphragms, wingwalls and portions of the maskwalls. Refer to the "Developmental Specifications for High Performance Concrete for Structures" for additional information. Includes all resilient joint filler required. Includes furnishing and placing subdrain (including excavation), floodable backfill, abutment backfill, porous backfill, geotextile fabric, water flooding and subdrain outlet at abutments and toe of berm. Includes furnishing and placing 3 inch diameter PVC plastic pipe and expanding foam in the abutment wings. Includes cost for materials and labor to provide concrete rustication lines.
10-12	Includes pier and abutment bearing material and coil ties. See Materials IM 570 Appendix I for allowable bearing substitutes at integral abutments. Includes contractor filling out beam numbers by location and beam seat elevations in "PPC Beam Data Spreadsheet" and forwarding Electronic Spreadsheet to the Engineer. Nonstandard stirrup lengths are used for these beams.
13	Includes 4 drains at 92 LB each and steel intermediate diaphragms.
14	Includes material and labor associated with providing and installing the rigid steel conduit, junction boxes, and fittings. Includes 487 L.F. of 2" diameter rigid steel conduit. 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.
15	Piling shall be Grade 50. For additional notes, see Design Sheet Nos. 9 & 12.
17	Includes furnishing and placing engineering fabric, granular subbase, reinforcing steel, structural concrete, resilient joint filler and all required excavating, shaping, and compacting.
18	Includes furnishing and placing engineering fabric, macadam stone, 4" x 6" treated timbers, ½" Dia. steel pins (or rebars), porous backfill or granular subbase backfill at front face of abutment footing and all required excavating, shaping and compacting.
19	Includes furnishing and placing engineering fabric, macadam stone, 4" x 6" treated timbers, ½" Dia. steel pins (or rebars), and all required excavating, shaping and compacting for wing armoring.
22	Includes all cost for furnishing and placing CMP pile casing and blocking material, including methods required to temporarily brace the CMP pile casing during construction. Payment for pile casing will be made on a lineal foot basis for casing incorporated in the east embankment. See Design Sheet No. 11 for details. Includes material and labor associated with providing and filling CMP with bentonite slurry and sand.
23	The abutments require shoring to retain the adjacent roadway embankment. Shoring shall remain in place and will be removed in future stage construction and become the property of the future Contractor. See Design Sheet No. 5 for location. See General Notes for shoring requirements. Shoring shall satisfy Build America, Buy America requirements of Article 1107.06, B of the Standard Specifications. Includes all excavation and backfill required for installation of shoring.

Roadway quantities are shown elsewhere in these plans.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Estimated Quantities

STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 1 of 41FHWA No. 041951

Summary of Concrete Quantities		
Location	Structural Concrete	● HPC Structural Concrete
West Abutment Ftg. **	37.2	-
East Abutment Ftg. **	37.2	-
Bridge Deck + Abut. & Pier Diaphragms + Abut. Wings ***	-	614.5
Pier No. 1	224.9	-
Pier No. 2	224.9	-
Total (Cu. Yds.)	524.2	614.5

** Includes Abutment Maskwalls Below Construction Joint
*** Includes Abutment Maskwalls Above Construction Joint
● Fiber Reinforced

Summary of Reinforcing Steel			
Location	Non-Coated Reinforcing Steel	Stainless Steel Reinforcing Steel	Epoxy Coated Reinforcing Steel
Bridge Deck + Abutment Footing *	226	-	164,685
Abutment Wings	-	-	1,002
Pier No. 1	42,600	-	-
Pier No. 2	42,600	-	-
Barrier Rails	-	5,067	17,589
Barrier Rail - End Sections	-	458	582
Total (Lbs.)	85,426	5,525	183,858

* Includes Abutment Diaphragms & Maskwalls and Pier Diaphragms

Summary of Excavation	
Location	Class 20 Excavation
West Abutment	125
Pier No. 1	545
Pier No. 2	305
East Abutment	70
Total (Cu. Yds.)	1,045

Summary of Foundations					
Location	Substructure Type	Foundation Type	Number	Length (Lin. Ft.)	Total (Lin. Ft.)
West Abutment	Integral Abutment	HP 10x57	11	75	825
East Abutment	Integral Abutment	HP 10x57	11	70	770
Pier No. 1	Frame Pier	HP 10x57	40	40	1,600
Pier No. 2	Frame Pier	HP 10x57	40	40	1,600
	Total HP 10x57 (Lin. Ft.)				4,795

Summary of Prebored Holes			
Location	Number	Length (Lin. Ft.)	Total
West Abutment	11	10	110
East Abutment	4	10	40
Total (Lin. Ft.)			150

Summary of Structural Steel	
Location	Total (Lbs.)
Diaphragms	9,405
Bridge Deck Drains	368
Total (Lbs.)	9,773

Summary of Bearings			
Location	Bearing Type	Number	Associated Bid Item
West Abutment	3 x 3 Bar	9	PPC Beams
East Abutment	3 x 3 Bar	9	PPC Beams
Pier No. 1	Plain Neoprene 1"	9	PPC Beams
Pier No. 2	Plain Neoprene 1"	9	PPC Beams



Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

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Summary Quantities

STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 2 of 41FHWA No. 041951

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 2023, plus applicable General Supplemental Specifications, Developmental Specifications, Supplemental Specifications and Special Provisions, including the following shall apply to construction work on this project:

- Developmental Specifications for "High Performance Concrete for Structures",
- Developmental Specifications for "Mass Concrete-Control of Heat of Hydration",
- Developmental Specifications for "Fiber Reinforcement for Structural 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 LRFD AASHTO Section 5, f'c = 4.0 ksi, except Prestressed Beam Concrete as noted.
- Prestressed Concrete Beams, see Design Sheet 21.
- Structural Steel in accordance with AASHTO LRFD Section 6, ASTM A709 Grade 50 (AASHTO M270 Grade 50), except as noted.

General Notes:

This design is for the replacement of the existing 280'-0" x 56'-0" PPCB E.B. Bridge, Design Nos. 4658 & 1391 with a year of construction of 1958 & 1992. Electronic plans of the Existing Structure are available to the Contractor as part of the E-Files supplied with the contract documents.

This bridge is designed for HL-93 loading, plus 20 lbs. per square foot of roadway for future wearing surface.

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.

The lump sum bid item for "Removal of Existing Bridge" shall include all costs associated with removing the existing 280'-0" x 56'-0" PPCB E.B. Bridge (Design No. 4658) and widening plans (Design No. 1391). Removals shall be in accordance with Section 2401, of the Standard Specifications.

Faint lines on plans indicate the existing structure.

Roadway excavation will not be part of the project but it will be included in a tied project associated with this contract. Excavation quantities for the piers and abutments are based on the assumption that roadway excavation will have been completed and abutment fills are in place prior to starting construction of the piers and abutments.

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.

The Bridge Contractor shall prebore holes for abutment piles as noted. Holes shall be bored to the elevations shown on the "Longitudinal Section along CL E.B. Roadway" on Design Sheet 5. Piles shall be driven through the holes to at least the specified design bearing.

The approach fills are not a part of this project, but it will be included in another tied project associated with this contract. The approach fill as shown are to be in place before abutment piles are driven.

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).

All reinforcing is to be securely wired in place before concrete is poured.

All exposed concrete corners, 90 degrees or sharper to be filleted with a ¾" dressed and beveled strip, unless noted otherwise.

These bridge plans label all reinforcing steel with English notation (5a1 is ⅝" 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.

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 is shown in the tied roadway plans, Project No. IM-NHS-080-4(85)138--03-77.

The contractor shall be responsible for ensuring stability of prestressed concrete beams during erection and construction up through the concrete bridge deck reaching its full 28-day strength. The contractor shall provide sufficient temporary anchor bracing at beam ends and temporary intermediate bracing as needed to ensure prestressed beam stability. Partially or fully installed permanent bracing as shown in these design plans shall not be assumed sufficient to brace prestressed beams during erection and construction. Temporary bracing shall not be welded to prestressed beam stirrups.

Guardrail is to be placed under tied project IM-NHS-080-4(85)138--03-77.

Working Drawing and Calculation Submittals			
Working drawings and calculations shall be submitted for the following items shown in the table below. (Note additional working drawings and calculations may be required in accordance with Article 1105.03 of the Standard Specifications.)			
Submittal requirements for working drawings and calculations shall be in accordance with 1105.03 of the Standard Specifications for Highway and Bridge Construction of the Iowa Department of Transportation. The absence of a certification requirement for a submittal does not relieve the contractor of the responsibility to attain certification.			
Calculation submittals in the table which are associated with working drawing submittals shall be submitted on the same day. Review time for calculation submittals shall be of the same duration as and run concurrently with review time for associated working drawings. The calculation submittals listed in the table are not meant to be an exhaustive list and do not relieve the Contractor from providing additional calculation submittals if requested by the Engineer.			
No.	Working Drawing Description	Working Drawing File Name Convention for Submittal	Certified by Iowa P.E. (Yes/No)
	1 Steel Diaphragms	(087)_Polk_Design226_SteelDiaphragms.pdf	No
	2 Deck Drains	(087)_Polk_Design226_DeckDrains.pdf	No
3	Shoring	(087)_Polk_Design226_Shoring.pdf	Yes
No.	Calculation Description	Calculation File Name Convention for Submittal	Certified by Iowa P.E. (Yes/No)
	4 Shoring	(087)_Polk_Design226_Shoring.pdf	Yes

Bridge Deck Dimensions Table			
	Item	Units	Quantity
1	Deck Length	L.F.	227.1
2	Minimum Deck Width	L.F.	77.2
3	Maximum Deck Width	L.F.	77.2
4	Deck Area	S.F.	17,532

- Deck length is measured from face-to-face of paving notches along the centerline of the roadway.
3. Deck widths are measured from out-to-out of deck perpendicular to the centerline of the roadway.
4. Deck area is to be based on the face-to-face paving notch distance and out-to-out deck dimensions.

Forms for pier caps on Pier Nos. 1 and 2 may be removed with the approval of the Engineer when the following two conditions have been met:

- Pier cap concrete has been in place for a minimum of 2 calendar days excluding days that the concrete surface is subjected to temperatures at or below 40°F and
- The pier cap concrete strength is at least 2500 psi.

Minimum concrete compressive strength of 2500 psi shall be verified by flexural strength according to Materials I.M. 316 with a minimum flexural strength of 450 psi or by the maturity method according to Materials I.M. 383. Curing of pier cap concrete shall be in accordance with the Standard Specifications. Pier cap concrete shall be subjected to exterior loads in accordance with Article 2403.03, N, 2 of the Standard Specifications.

A scrape sample was taken from an abutment bearing of the bridge to get an indication of the existence of and level of total lead and total chromium. Analysis of total lead on this sample was 960 parts per million (PPM). Analysis of total Chromium on this sample was <42 PPM. These analyses show the existence of these two toxic constituents. Levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other constituents were analyzed. The bidder should not rely on the Iowa DOT's testing and analysis for any purpose other than as an indication of the existence of these two toxic constituents.

Design History at this Site (Includes this Design)	
Des. No.	Type of Work
4658	Original Design - PPCB
3477	Overlay, Concrete Barrier Rails
1391	Bridge Widening - PPCB
1192	Re-overlay
226	Bridge Replacement - PPCB

All plan dimensions are horizontal unless noted otherwise.

Traffic control plan:
The roadway will be closed to thru traffic. Refer to the traffic control plan included in the tied road plans, Project No. IM-NHS-080-4(85)138--03-77.

The tied road plans, Project No. IM-NHS-080-4(85)138--03-77 contain the pollution prevention plan.

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 shoring plan for review. The shoring plan shall be designed and certified by a Professional Engineer licensed in the State of Iowa. When determining slope stability to support structures such as bridges, culverts and retaining walls, a global stability analysis shall be included in the design of the temporary shoring in accordance with Chapter 200F-1 in the Design Manual of the Iowa DOT, Design Bureau. The Contractor shall not proceed with installation of the shoring without notice to proceed from the Engineer.

- The 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
 - Design parameters (including design loads, retained fill height and required bottom of shoring elevations to accommodate any abutment removals)

Shoring to remain in place and be removed by others in a future contract, and shall be paid for as a lump sum including all cost for designing, furnishing and installing. Shoring shall satisfy the requirements of Material I.M. 107 and Articles 1107.06, B and 1107.07, of the Standard Specifications. A copy of the as-built shoring plans shall be submitted to the RCE.

CMP pile casings shall be centered around the piling in the abutments and blocked in place as shown on Design Sheet 11. The CMP pile casings shall have a minimum 12 gage wall thickness. CMP pile casings shall be backfilled with a loose dry sand meeting Specification 41110, Gradation No. 1 as shown in the Abutment Notes on Design Sheet No. 11.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

General Notes

STA. 1131+93.78, 42.00' Rt. (☞ I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 3 of 41FHWA No. 041951

General Notes for Concrete Rustication:

Strips and panels used as inserts within concrete forms to create the rustication features may be made of wood, steel, plastic or other nonporous material capable of withstanding anticipated concrete pour pressures without physical defects. Wood inserts, if used, shall be free of warp, twist, checks or cracks, and shall be presoaked prior to placement of concrete in the forms.

Rustication inserts shall easily attach to forms and shall not allow leakage of concrete between the form and the insert. When steel forms are used, rustication strips may be rigidly attached to the inside surfaces of the forms. When steel forms are not used, rustication strips and other inserts for small recesses on exposed concrete surfaces shall be fastened to the forms in a manner that will permit them to remain in place when the forms are removed. Leave inserts in place until they can be removed without damage to the surrounding concrete.

The inserts shall be designed to form surfaces and features conforming to the design intent including the shape, lines, depths and dimensions shown in the plans. Create inserts using a minimum number of splice joints in their length. Splices, if used, shall be tightly joined so as not to allow gaps or leaks, and shall not create any change in alignment or shape of the rustication feature. Do not locate form ties within concrete rustications.

For rustication features following the perimeter of rounded surfaces, it may be necessary to use multiple layers of insert material in order to achieve the radius curve. This is acceptable, provided that the final shape, line, depth, and dimension of the features are maintained in the final result.

During loading of forms with concrete, take extra care to ensure proper consolidation of concrete around all rustication inserts to preserve the shape, line and depth of all intended features in the final concrete surface. Following removal of forms, repair all defects to achieve the rustication features as specified in the plans. Patch voids, honeycomb areas, etc., in accordance with the Standard Specifications. If surfaces will not receive a colored sealer coating, add white cement to the patching mortar to lighten it in order to match or be slightly lighter than surrounding concrete when dry. Completed surface shall be free from blemishes, surface voids and conspicuous form marks to the satisfaction of the Engineer. The Contractor shall correct any surface defects to the satisfaction of the Engineer at no additional cost to the project.

All costs associated with concrete rustication are to be included in the bid item "High Performance Structural Concrete".



Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

General Notes

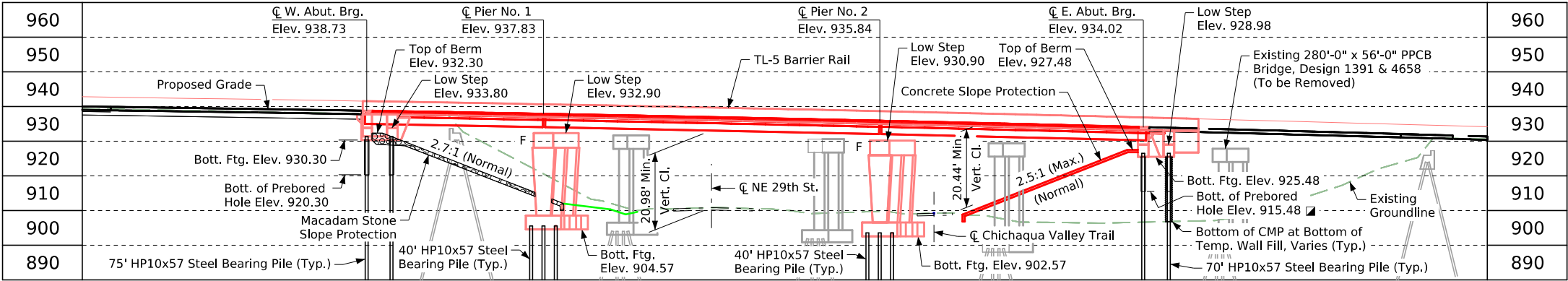
STA. 1131+93.78, 42.00' Rt. (☒ I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 4 of 41FHWA No. 041951

Note:
Top of bridge deck at
☐ E.B. Roadway is
1.02' above the profile
grade to account for
parabolic crown.



Longitudinal Section Along ☐ E.B. Roadway

☐ Prebored Holes for piles
outside the Temporary
Wall backfill zone.

Minimum Vertical
Clearance (Pt. A)

Overhead Station = 1131+88.52, 4.67' Rt.
Overhead Elevation = 935.91
Depth of Superstructure = 3.93'
Underpass Station = 38804+34.48
Underpass Elevation = 911.00
Minimum Vertical Clearance = 20.98'

Minimum Vertical
Clearance (Pt. B)

Overhead Station = 1132+58.05, 4.67' Rt.
Overhead Elevation = 934.37
Depth of Superstructure = 3.86'
Underpass Station = 15+71.93, 5.00' Rt.
Underpass Elevation = 910.07
Minimum Vertical Clearance = 20.44'

Location

I-80 E.B. over NE 29th Street
T-79N R-23W
Section 17 & 18
Delaware Township
Polk County
FHWA No. 041951
Bridge Maint. No. 7738.7R080
Latitude 41.654148°
Longitude -93.560995°

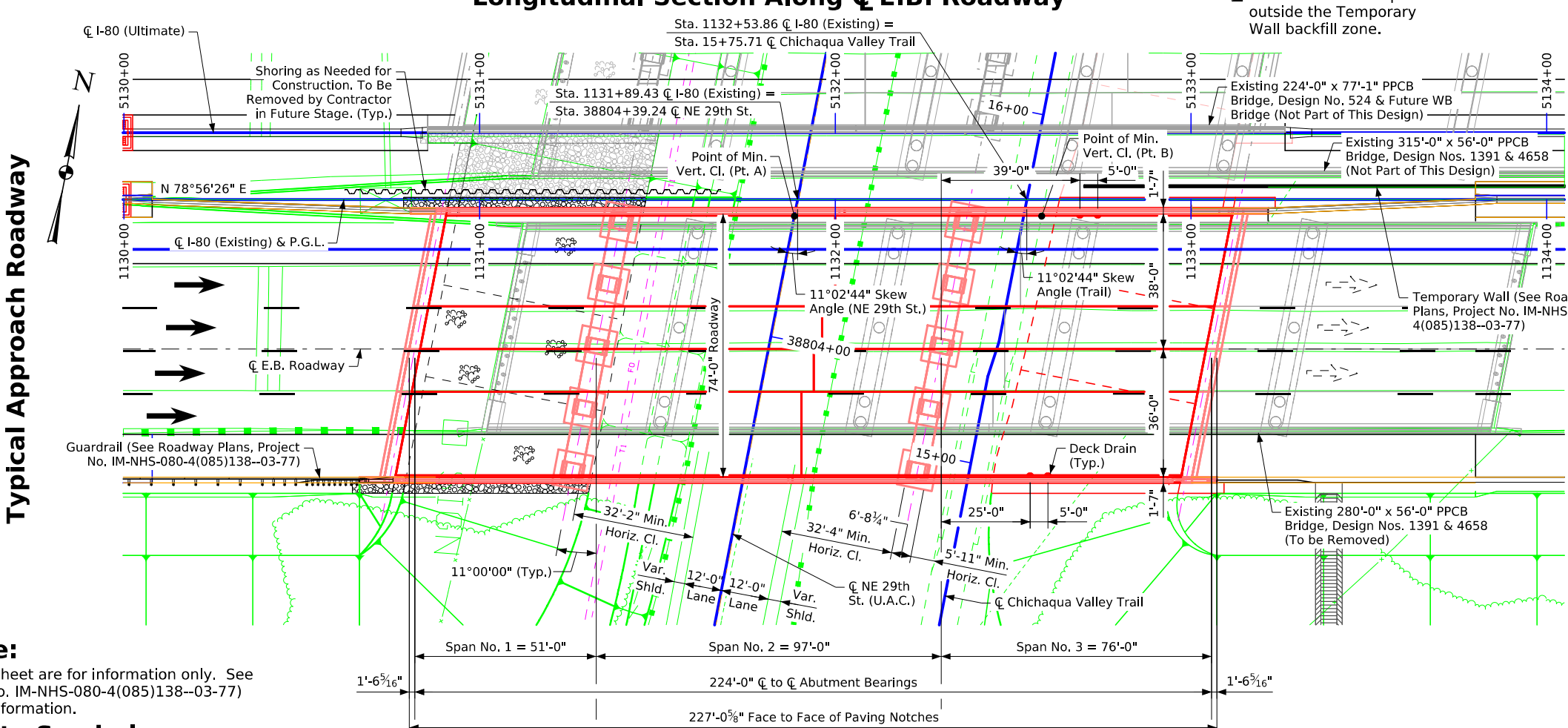
Traffic Estimate

2024 AADT	48,946	V.P.D.
2044 AADT	60,270	V.P.D.
2044 DHV	6,230	V.P.H.
Trucks	17	%
Total Design ESALS	-	

NE 29th St.
Traffic Estimate

2024 AADT	3,840	V.P.D.
2040 AADT	3,900	V.P.D.
2040 DHV	490	V.P.H.
Trucks	11	%
Total Design ESALS	-	

Notes:
All units are in feet unless noted otherwise.
All plan dimensions are in the horizontal plane unless noted otherwise.

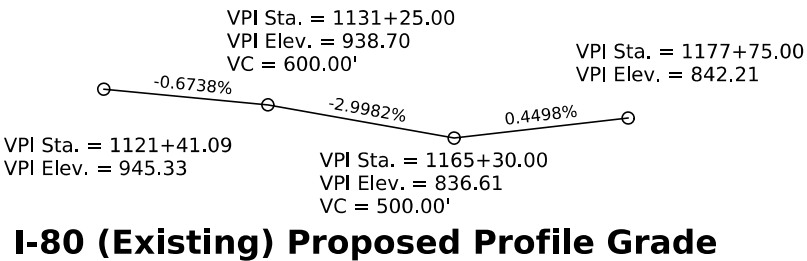
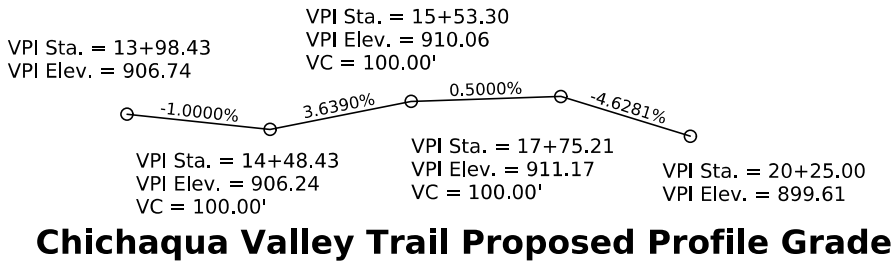


Utilities Note:

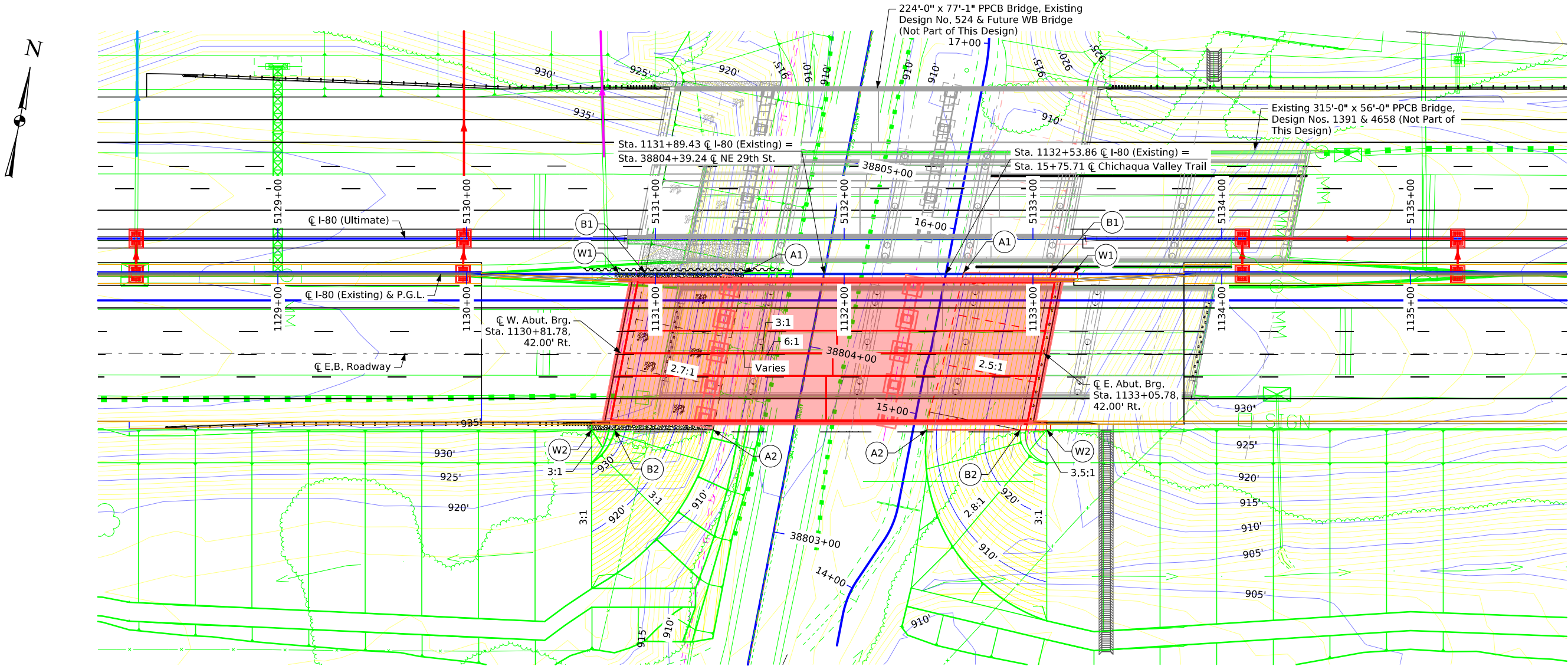
Utilities shown on this sheet are for information only. See Road Design (Project No. IM-NHS-080-4(085)138-03-77) sheets for final utility information.

General Utility Symbols:

- E - Electric Line
- G - Gas Line
- SAN. - Sanitary Sewer
- T - Telephone Line
- W - Water Line
- FO - Fiber Optic Line
- GHP - Gas High Pressure
- ST S - Storm Sewer
- TV - TV
- - Power Poles



Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
51'-0" & 76'-0" End Spans 97'-0" Interior Span
Situation Plan
STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 5 of 41 FHWA No. 041951



Site Plan

Berm Slope Location Table						
Points	West Abutment			East Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	1131+46.90	0.58' Lt.	912.00	1132+63.17	0.58' Lt.	909.30
A2	1131+30.65	82.58' Rt.	912.00	1132+43.88	82.58' Rt.	907.96
B1	1130+94.64	0.58' Lt.	932.30	1133+09.47	0.58' Lt.	927.48
B2	1130+78.47	82.58' Rt.	932.30	1132+93.31	82.58' Rt.	927.48
W1	1130+80.64	0.58' Lt.	937.74	1133+21.69	0.58' Lt.	932.60
W2	1130+66.26	82.58' Rt.	938.03	1133+07.31	82.58' Rt.	933.02

Berm slope elevations reflect the grading surface.

Notes:
For notes, see Design Sheet 5.
For slope protection, see Design Sheets 36 & 37.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

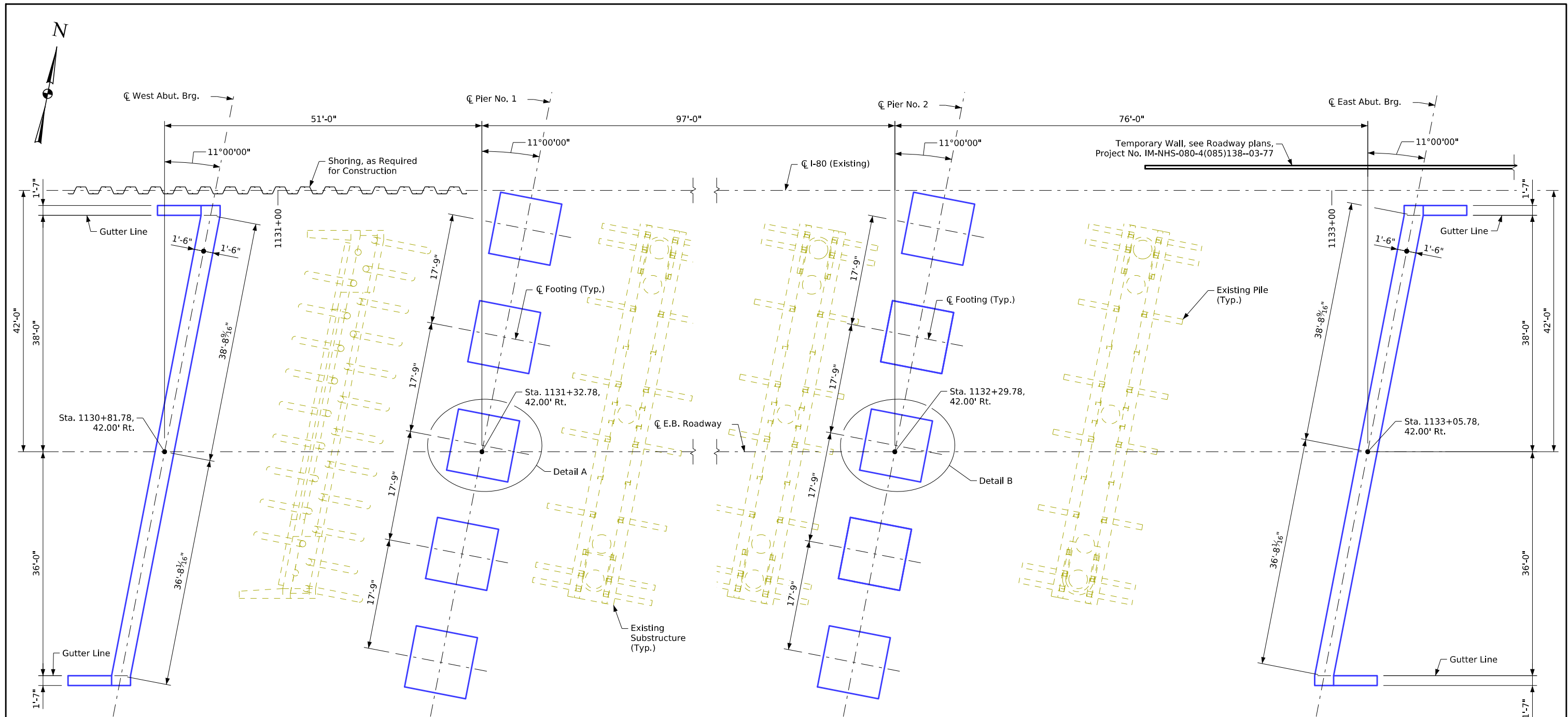
Situation Plan - Site

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

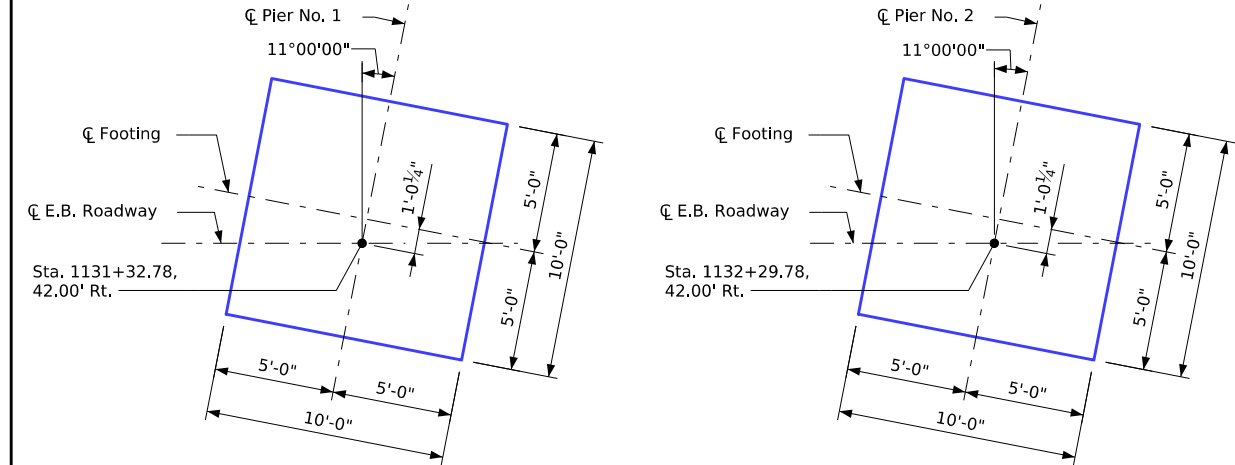
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 6 of 41FHWA No. 041951



Staking Diagram



Bridge Coordinates				
Location	☐ W. Abut. Brg.	☐ Pier No. 1	☐ Pier No. 2	☐ E. Abut. Brg.
Left Edge of Deck	E = 1623637.881 N = 602696.892	E = 1623687.934 N = 602706.675	E = 1623783.133 N = 602725.283	E = 1623857.721 N = 602739.861
☐ E.B. Roadway	E = 1623637.923 N = 602656.568	E = 1623687.976 N = 602666.351	E = 1623783.175 N = 602684.958	E = 1623857.763 N = 602699.537
Right Edge of Deck	E = 1623637.963 N = 602618.281	E = 1623688.016 N = 602628.065	E = 1623783.214 N = 602646.672	E = 1623857.803 N = 602661.250

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 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

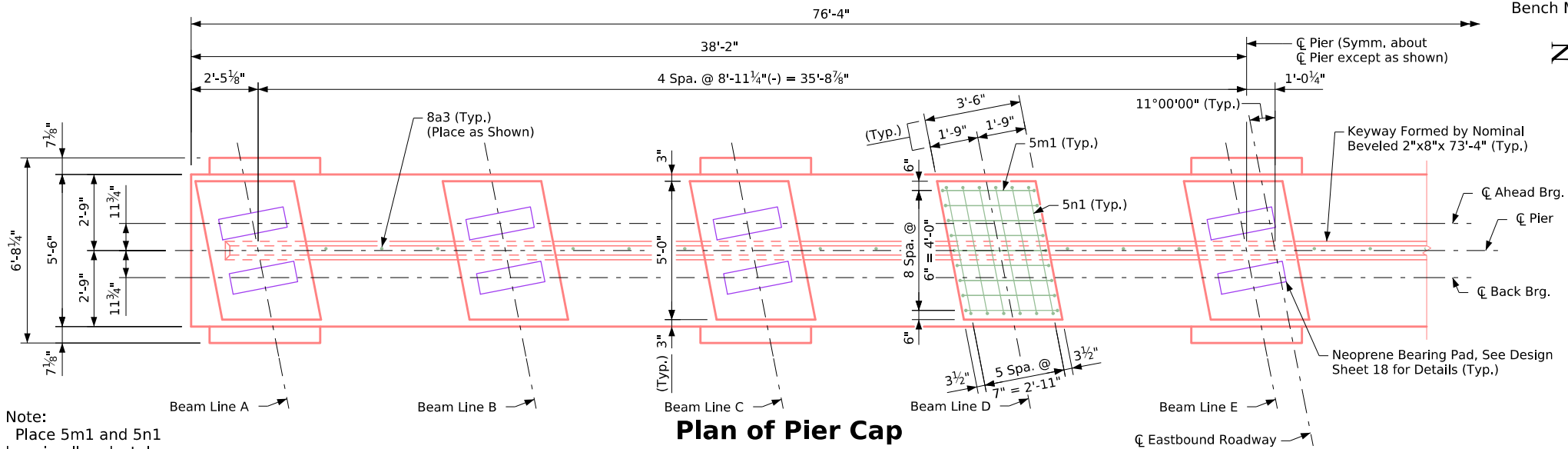
Staking Diagram

STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing)Turn-in Date: October, 2025

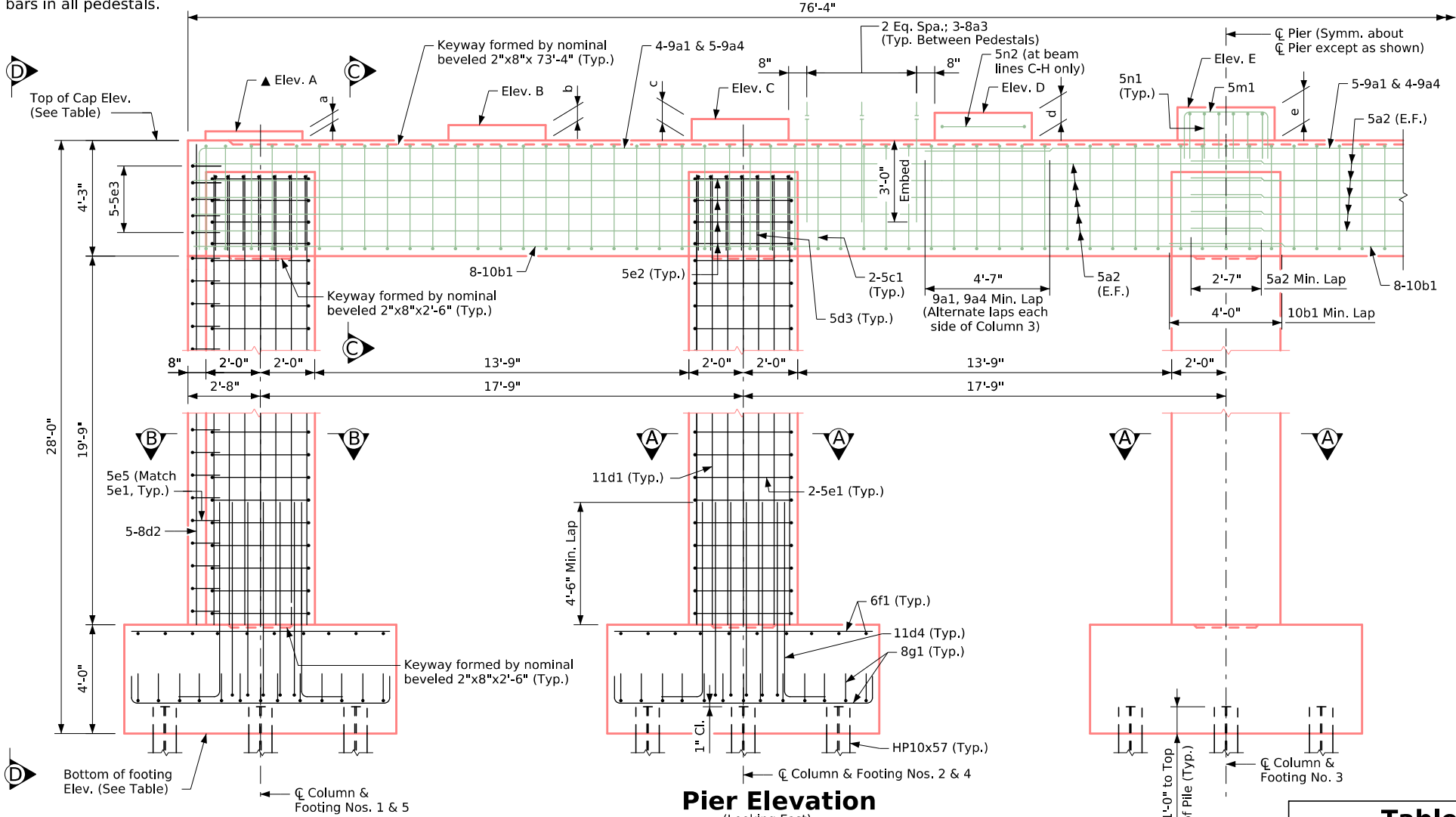
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 7 of 41FHWA No. 041951



Note:
Place 5m1 and 5n1 bars in all pedestals.



Pier Elevation

(Looking East)

Notes:
Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.
For Sections A-A, B-B, and C-C, See Design Sheet 9.
For Pier Rustication Details, See Design Sheet 10.
Column & Footing No. 3 and 4 reinforcing is similar to that shown for Column & Footing No. 2.
Column & Footing No. 5 reinforcing is similar to that shown for Column & Footing No. 1.
For pier cap early form work removal notes, see General Notes on Design Sheet 3.

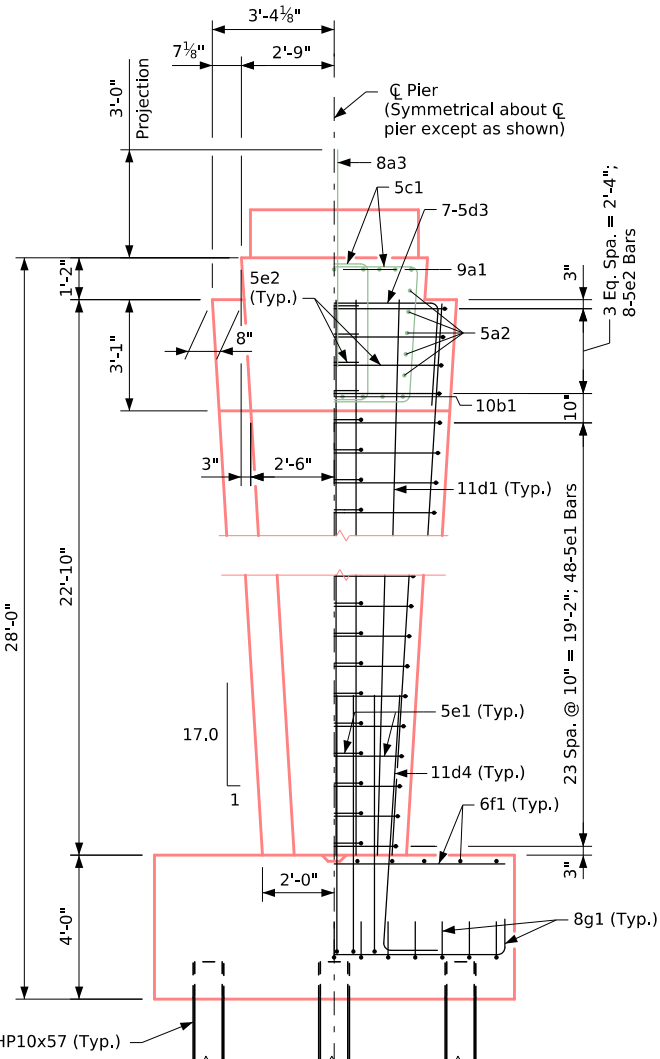
Table of Pier Steps

Step	Beam Line	Pier No. 1	Pier No. 2
a	A	4"	4"
b	B	7"	7 1/16"
c	C	10"	10 3/16"
d	D	1'-0 1/8"	1'-1 1/8"
e	E	1'-3 1/4"	1'-3 1/2"
f	F	1'-2 3/16"	1'-2 3/16"
g	G	1'-0 3/16"	1'-0 3/8"
h	H	9 13/16"	10 7/16"
i	I	7 11/16"	8 3/16"

Table of Pier Elevations

Elevation	Beam Line	Pier No. 1	Pier No. 2
Elev. A	A	▲ 932.90	▲ 930.90
Elev. B	B	933.15	931.16
Elev. C	C	933.40	931.42
Elev. D	D	933.64	931.66
Elev. E	E	933.84	931.86
Elev. F	F	933.75	931.78
Elev. G	G	933.58	931.62
Elev. H	H	933.39	931.44
Elev. I	I	933.21	931.26
Top of Cap	-	932.57	930.57
Bottom of Footing	-	904.57	902.57

▲ Low Step Elevation
Note:
All beam step elevations are at beam centerline.

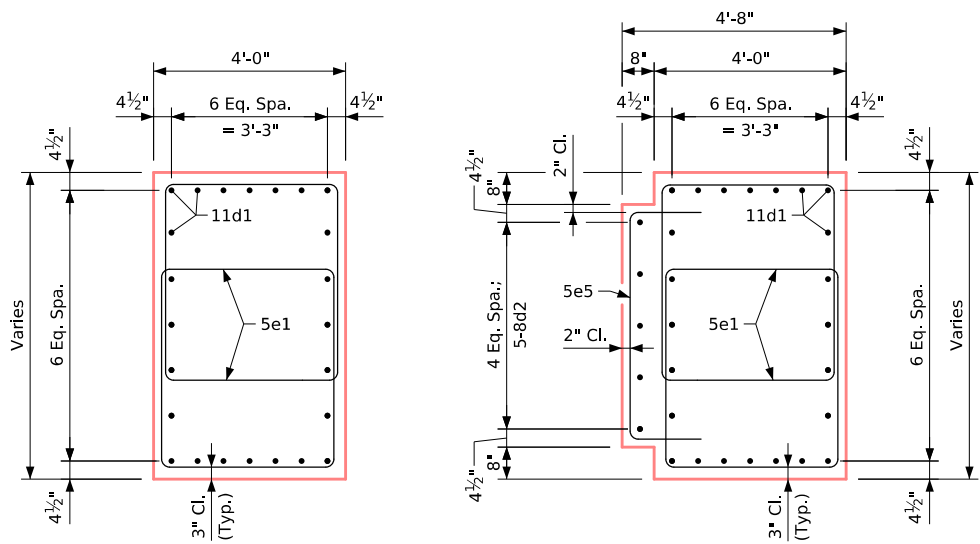


Pier End View D-D

(8d2, 5e3 & 5e5 Bars Not Shown for Clarity)

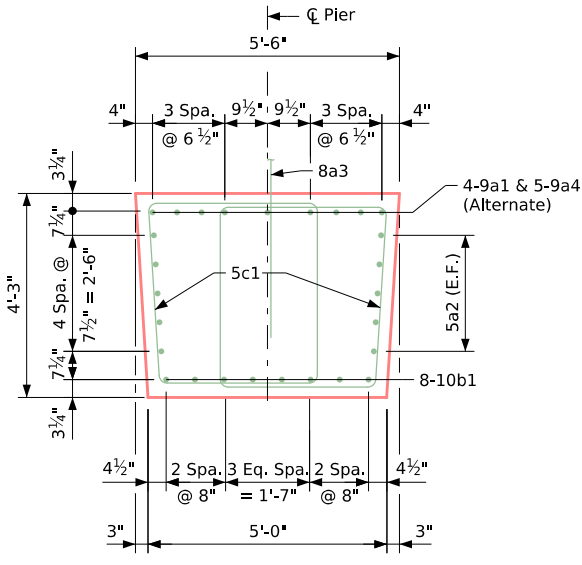
Design For 11°00'00" Skew (LA)
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51'-0" & 76'-0" End Spans 97'-0" Interior Span
Pier Details
STA. 1131+93.78, 42.00' Rt. (Cl I-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 8 of 41 FHWA No. 041951



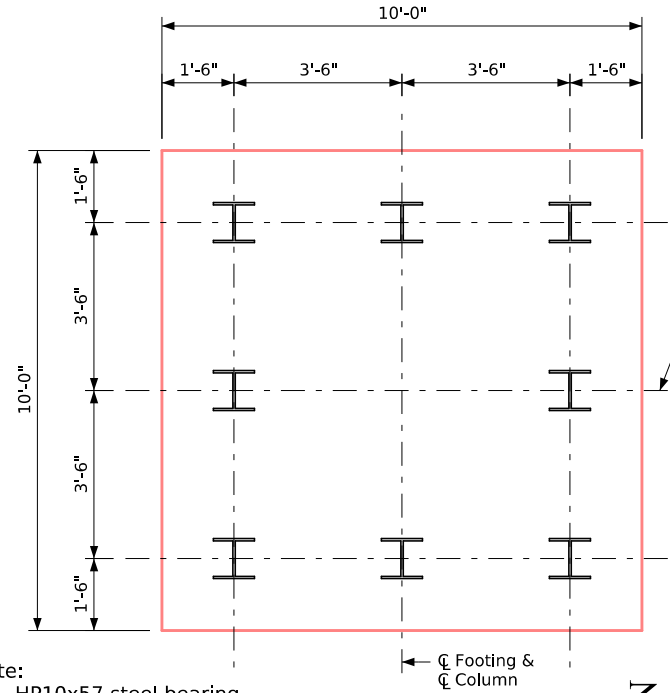


Section A-A

Section B-B

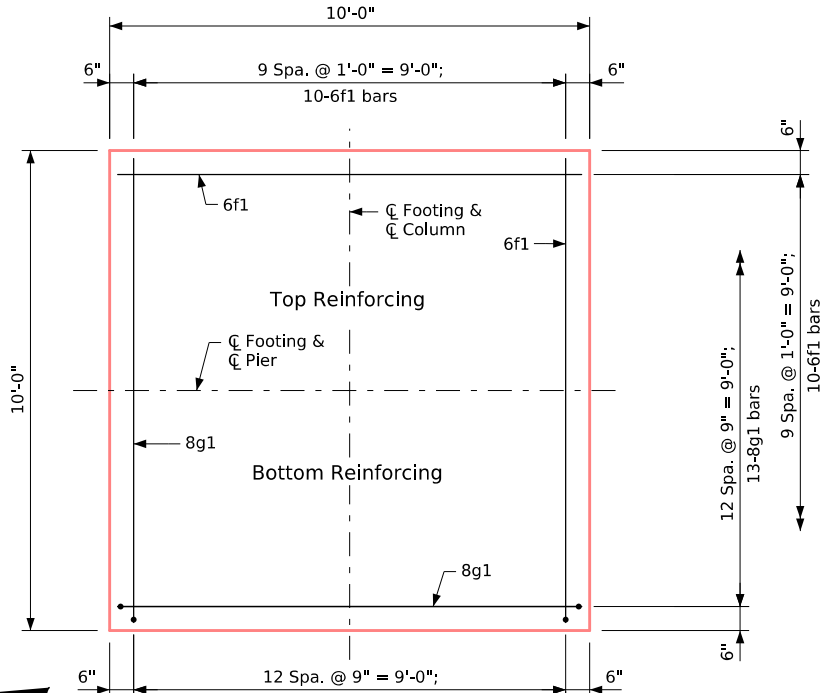


Section C-C
(Pedestal Not Shown for Clarity)

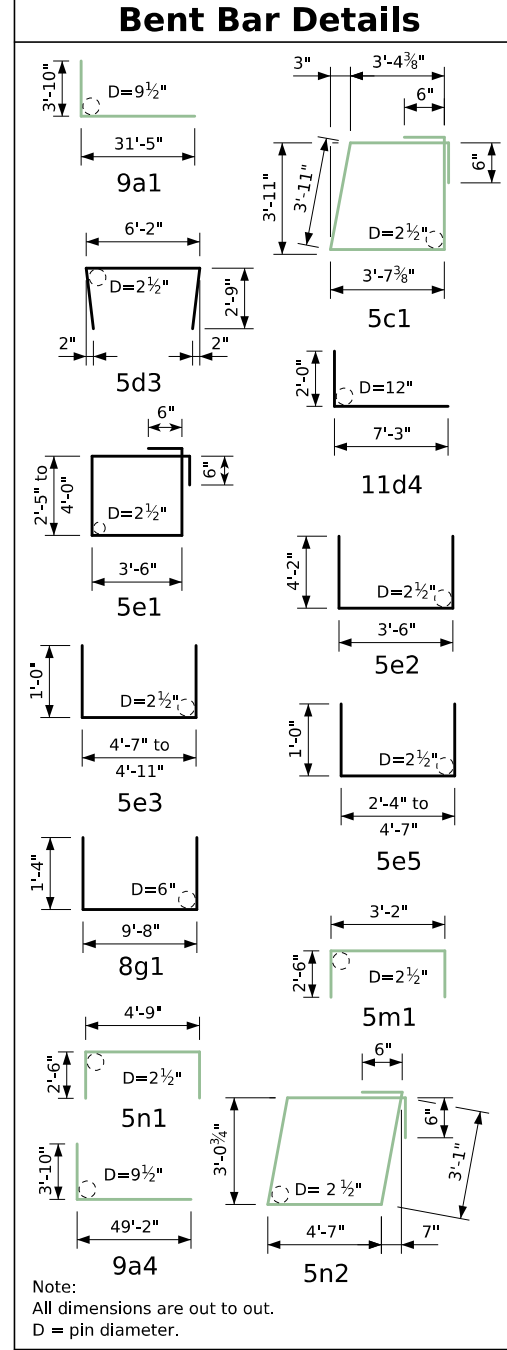


Note:
8 - HP10x57 steel bearing piling are required for each footing at Pier Nos. 1 and 2.

Pile Layout
(Typ. for Pier Footings)



Reinforcing Layout
(Typ. for All Pier Footings)



Reinforcing Bar List - One Pier

Bar	Location	Shape	No.	Length	Weight
9a1	Cap, Top, Longitudinal		9	35'-3"	1,079
5a2	Cap, Side, Longitudinal		20	39'-4"	820
8a3	Cap to Diaphragm Dowel		24	6'-0"	384
9a4	Cap, Top, Longitudinal		9	53'-0"	1,622
10b1	Cap, Bottom, Longitudinal		16	40'-0"	2,754
5c1	Cap, Hoops		182	15'-10"	3,006
11d1	Column, Vertical		120	22'-8"	14,451
8d2	Column, Vertical		10	23'-9"	634
5d3	Column, Top		35	11'-8"	426
11d4	Footing to Column Dowel		120	9'-3"	5,897
5e1	Column, Hoops		240	Varies	3,609
5e2	Column, Top, Hairpin		40	11'-10"	494
5e3	Column, Top, Ends		10	Varies	70
5e5	Column, Sides		48	Varies	280
6f1	Footing, Top		100	9'-8"	1,452
8g1	Footing, Bottom		130	12'-4"	4,281
5m1	Cap, Pedestal, Longitudinal		81	8'-2"	690
5n1	Cap, Pedestal, Transverse		54	9'-9"	549
5n2	Cap, Pedestal, Hoop		6	16'-4"	102
Reinforcing Steel - Total (LB)					42,600

Concrete Placement Quantities

Location	Pier No. 1	Pier No. 2	Quantity
Cap & Pedestals	71.5	71.5	143.0
Columns	79.3	79.3	158.6
Footings	74.1	74.1	148.2
Total (CY)	224.9	224.9	449.8

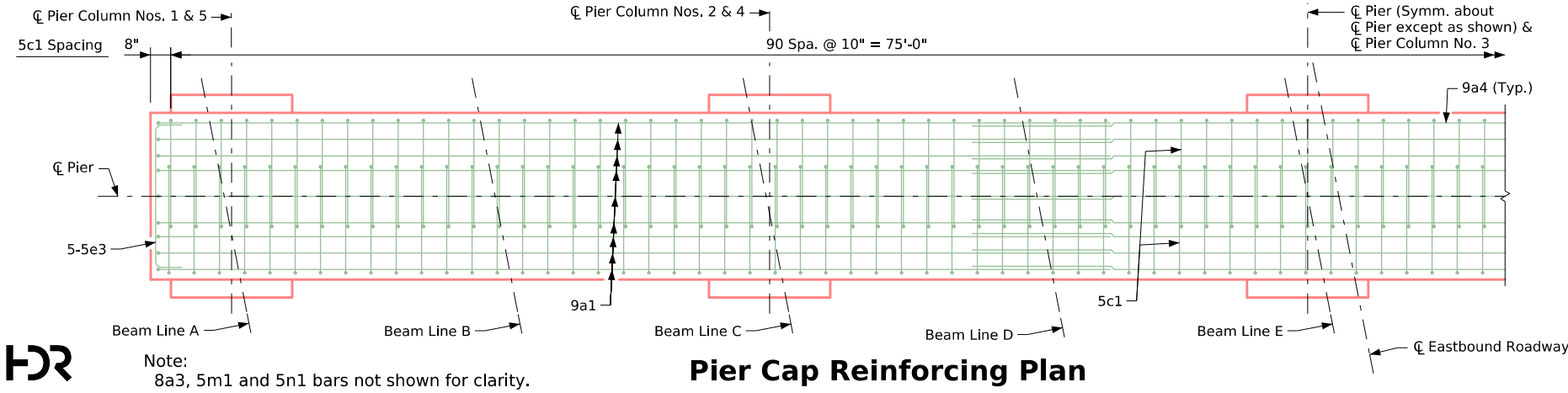
Note:
Concrete and reinforcing steel quantities are included on the Summary Quantities Sheet.

Pier Pile Notes:

The contract length of 40 feet for the pier piles is based on a cohesive soil classification, a total factored axial load per pile (Pu) of 198 kips, and a geotechnical resistance factor (phi) of 0.65 for soil and 0.7 for rock end bearing. Pier piles also were designed for a factored tension force of 16 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 for soil and 0.7 for rock end bearing. Piles are assumed to be driven from a start elevation at the bottom of footing.

The required nominal axial bearing resistance for pier piles is 138 tons at end of drive or retap. The pile contract length shall be driven as per plan unless piles reach refusal. In no case shall a pile be embedded less than 15 feet. Construction control requires a weap analysis with bearing graph.



Pier Cap Reinforcing Plan

Note:
For location of Sections A-A, B-B, C-C, and notes, see Design Sheet 8.



Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

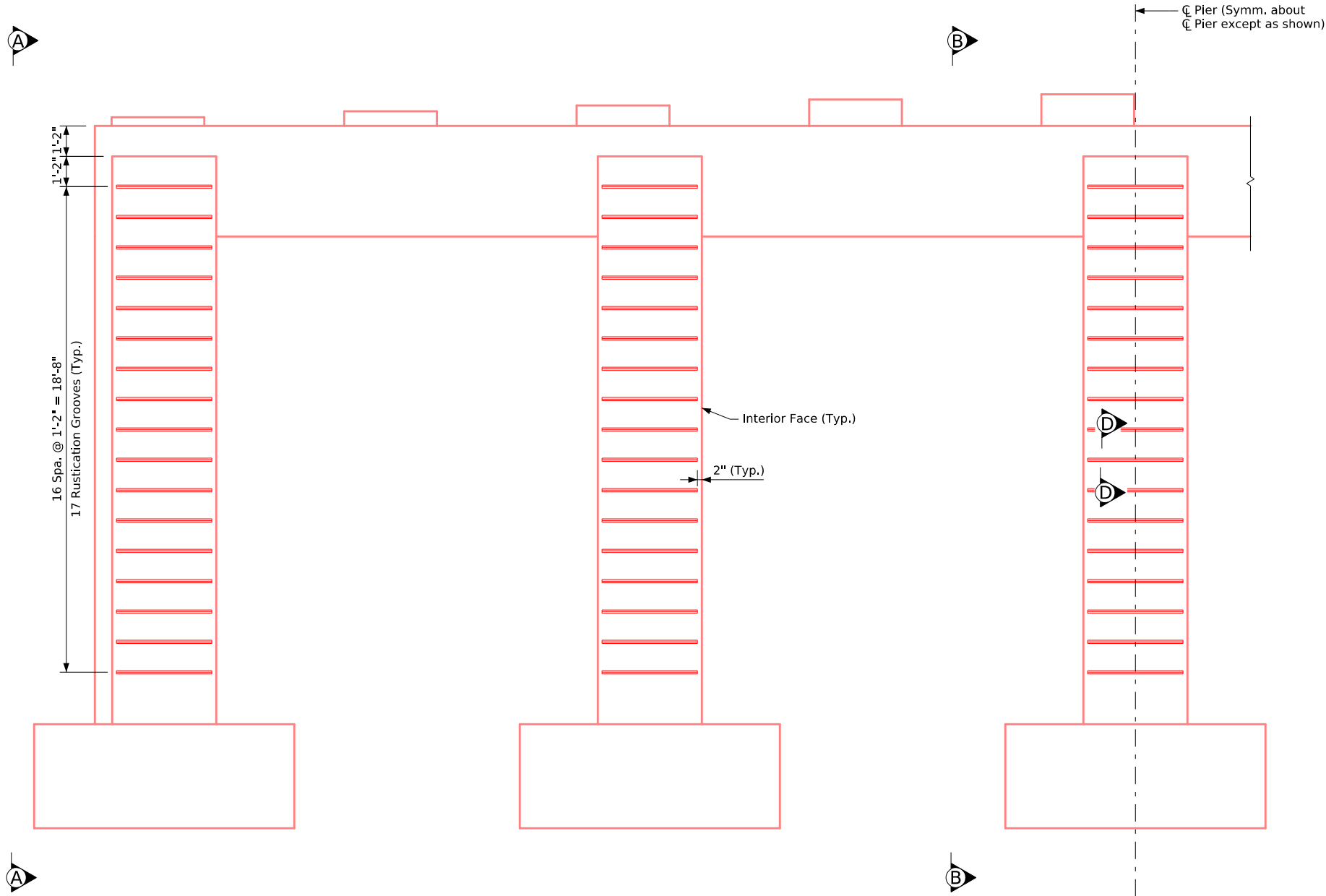
Pier Details

STA. 1131+93.78, 42.00' Rt. (Cl. I-80 Existing) Turn-in Date: October, 2025

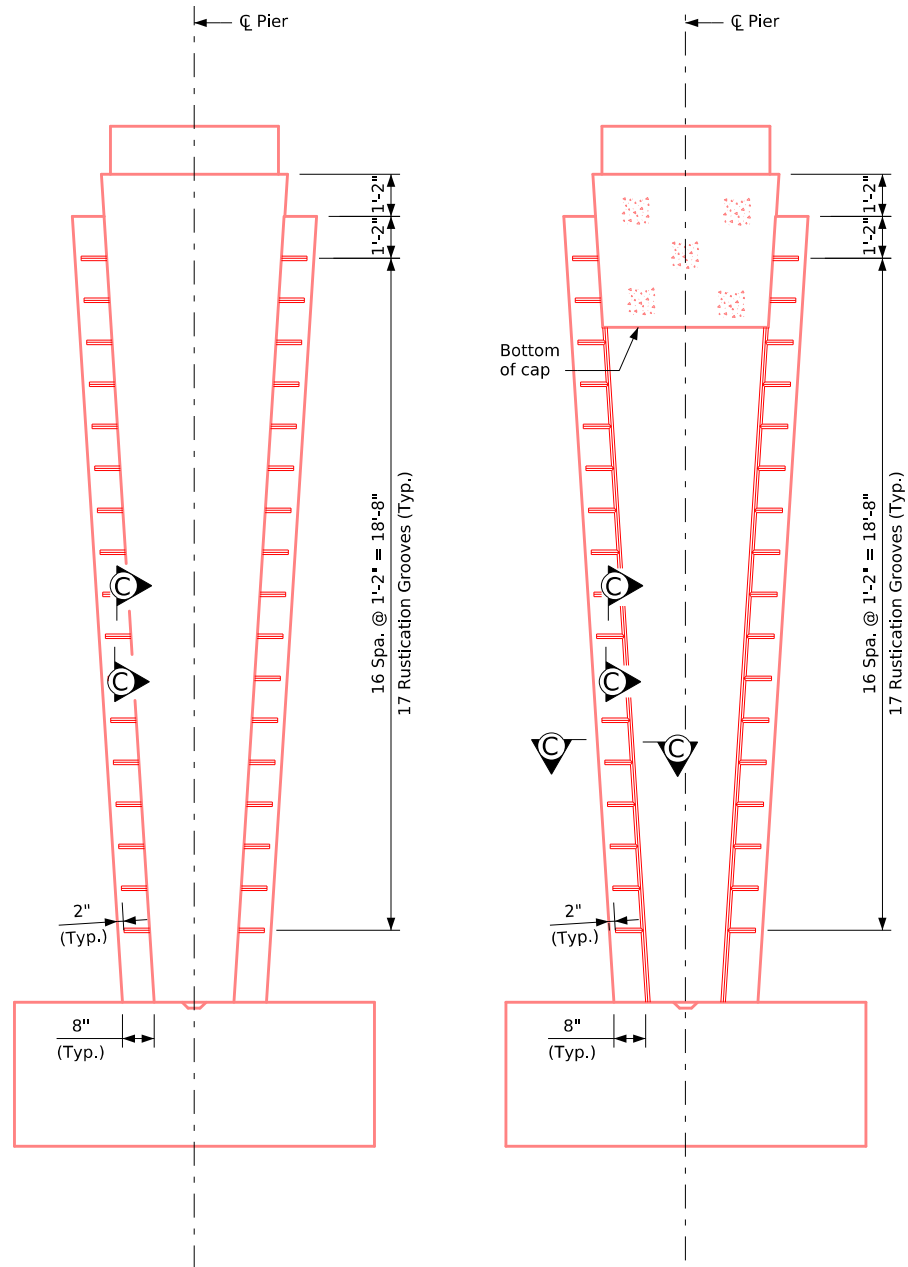
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 9 of 41 FHWA No. 041951



Pier Elevation



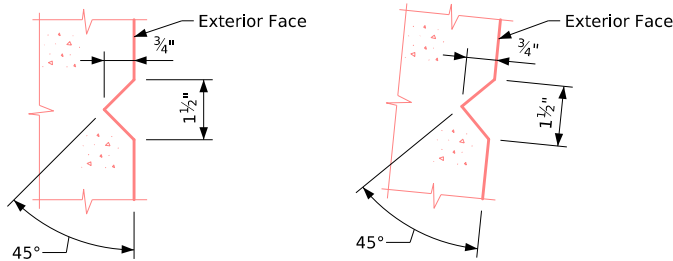
View A-A

View B-B
(Typical Interior Faces)

Pier Concrete Forms and Finish Notes:

Finished Pier surfaces shall show no wood grain or other texture from the face of the forms used. All costs for repair or covering of wood grain or other textures on exposed pier surfaces shall be the responsibility of the contractor. If used, repair and covering methods shall be only those approved by the engineer.

Arrange form ties to be regularly spaced and in a consistent geometric grid pattern. Do not locate ties within concrete rustications. Perform patching of tie holes and other voids so that patch matches or is slightly lighter than surrounding concrete when dry. Use white cement to lighten the patching mix.



Section C-C

Section D-D

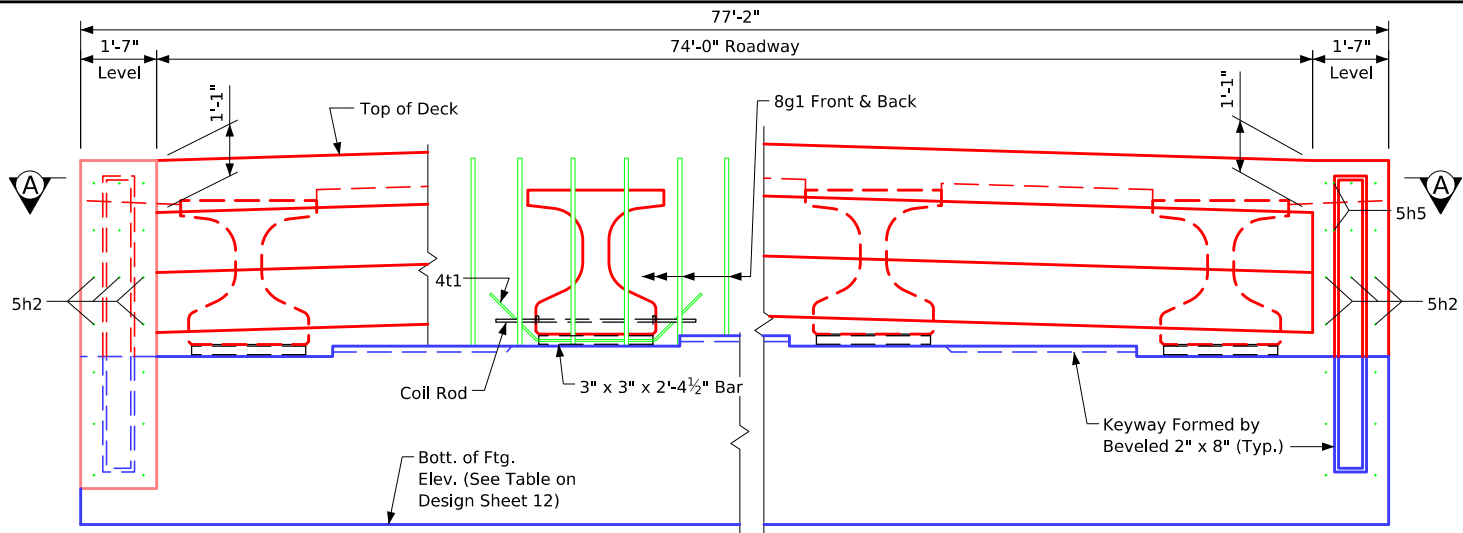
Rustication Details

Notes:
For concrete rustication notes, see Design Sheet 4.

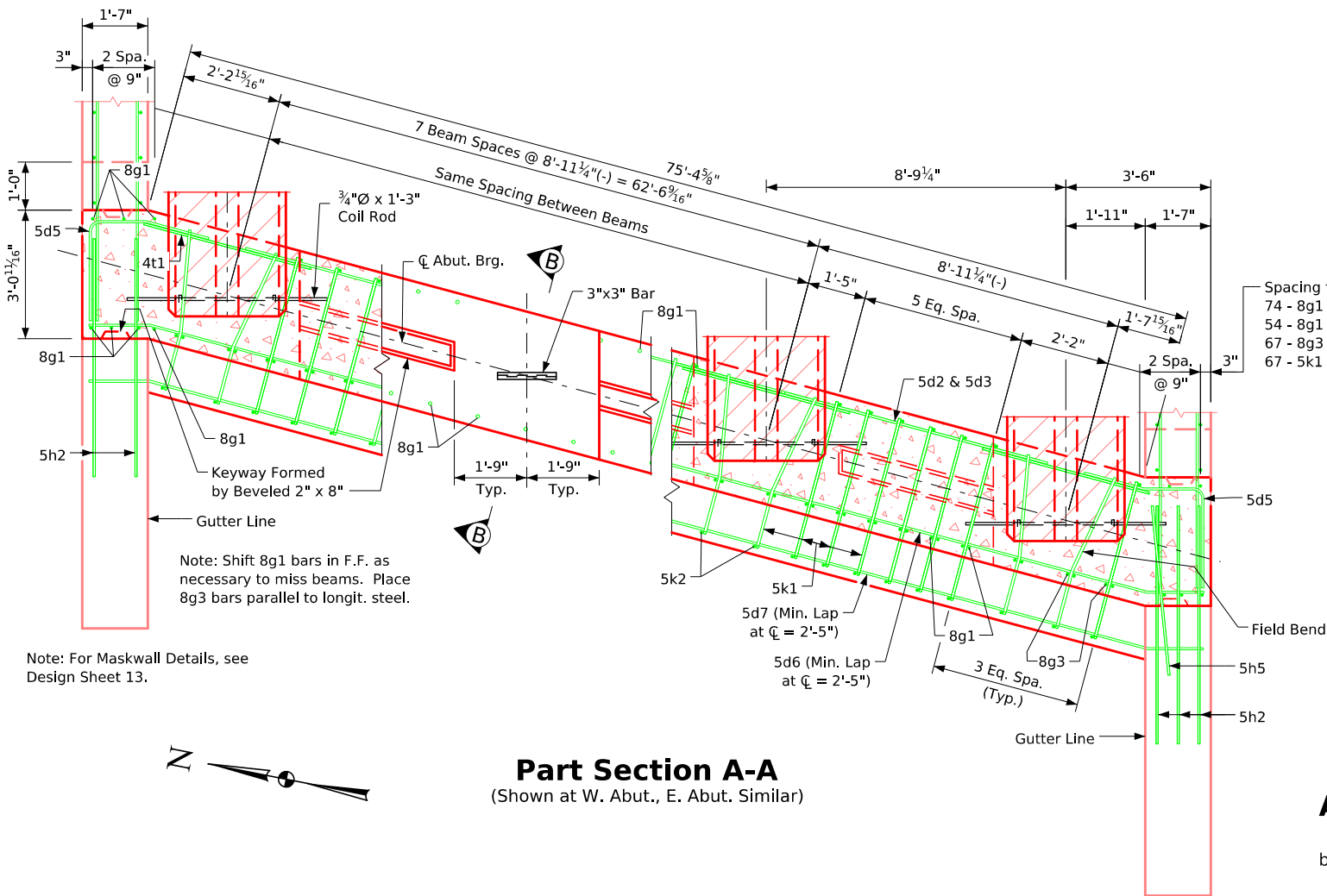
Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
51'-0" & 76'-0" End Spans 97'-0" Interior Span
Pier Rustification Details
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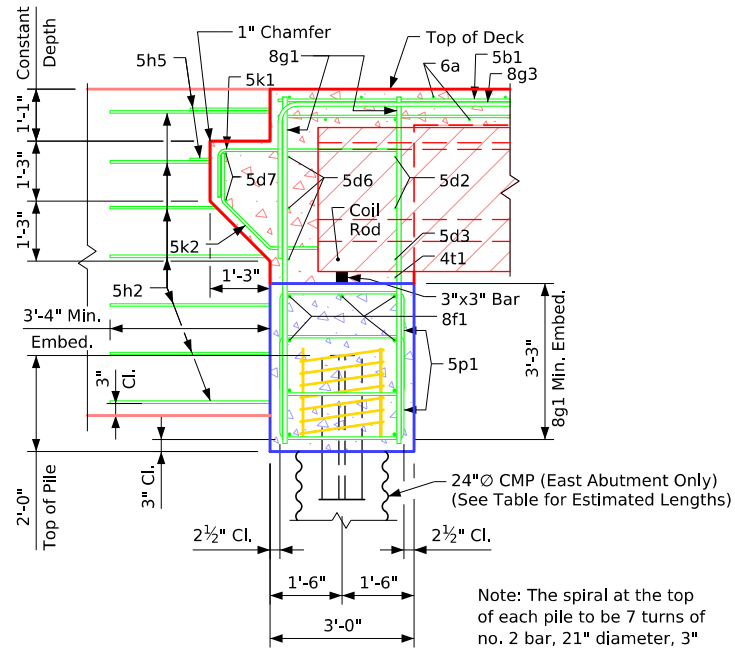
Correction 04-14: Added Concrete Quantity Table & Referral Note to Summary Quantity Sheet. Removed Design Bearing Note for Abut. Piling from Abutment Notes.
Issued 02-08.
Revised 08-2024: Updated "Abutment Step Diagram", removed the text and numbers to make the vertical dimensions neutral.
BTIntegralBridges.dgn - 2080-BTB - This Sheet Re-Issued 11-2023. Sheet Format Update.



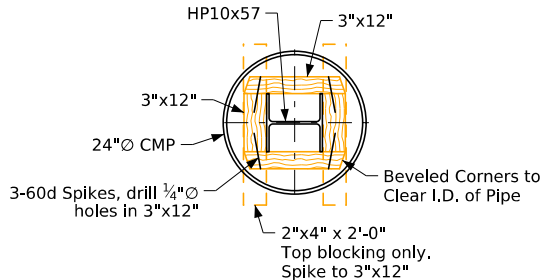
Part Rear Elevation at Abutment



Part Section A-A
(Shown at W. Abut., E. Abut. Similar)



Part Section B-B



CMP Blocking Detail
(At East Abutment Only)

Estimated CMP Pile Sleeve Lengths
(At East Abutment Only)

Pile No.	Bottom Elevation	Length (Lin. Ft.)
1, 2 & 3	906.48	19
4	910.48	15
5, 6 & 7	915.48	10
Total (Lin. Ft.)		102

Note: Piles are numbered sequentially from North to South.

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 and 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.

After the east abutment piles are driven, the CMP pile casing shall be backfilled with granular backfill to elevation 915.48, in accordance with Section 4133 of the Standard Specifications. The upper 10' of the CMP pile casing shall then be filled with bentonite slurry in accordance with Section 2501.03, Q, of the Standard Specifications. The cost for this work shall be included in the price bid for "Pile Casing, CMP, 24"".

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Abutment Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 11 of 41FHWA No. 041951

Table of Abutment Elevations

Point	West Abutment	East Abutment
Elev. A	▲ 933.80	▲ 928.98
Elev. B	934.05	929.25
Elev. C	934.29	929.51
Elev. D	934.53	929.76
Elev. E	934.72	929.96
Elev. F	934.63	929.89
Elev. G	934.46	929.73
Elev. H	934.27	929.56
Elev. I	934.08	929.38
Bottom Footing Elev.	930.30	925.48

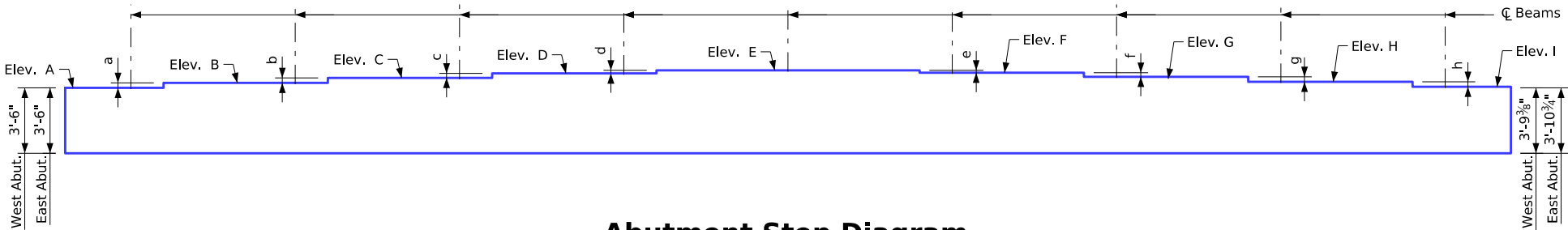
Table of Abutment Steps

Step	West Abutment	East Abutment
a	3"	3 1/8"
b	3"	3 1/8"
c	2 1/8"	3"
d	2 1/4"	2 1/16"
e	1 1/8"	1 9/16"
f	2 1/16"	1 7/8"
g	2 5/16"	2 1/2"
h	2 5/16"	2 1/8"

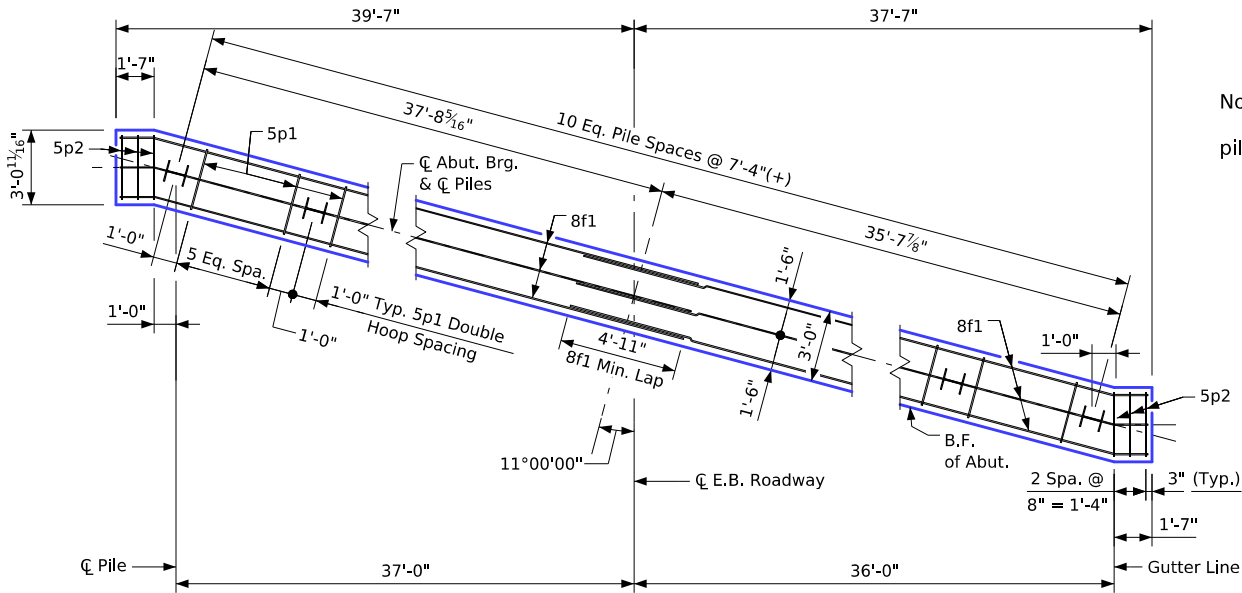
▲ Low Step Elevation

Abutment Concrete Quantity

Location	Quantity
West Abutment Footing *	37.2
East Abutment Footing *	37.2
Total (Cu. Yds.)	74.4



Abutment Step Diagram
(Looking East)



Abutment Pile Plan
(Shown at W. Abut., E. Abut. Similar)

Note:
11 - HP 10 x 57 steel bearing
piling required at each abutment.

West Abutment Pile Notes:

The contract length of 75 feet for the West Abutment piles is based on a cohesive soil classification, a total factored axial load per pile (PU) of 180 kips, and a geotechnical resistance factor (phi) of 0.65 for soil and 0.7 for rock end bearing.

The nominal axial bearing resistance for construction control was determined from a cohesive soil classification and a geotechnical resistance factor (phi) of 0.77 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 west abutment piles is 124 tons at the end of drive or retap. The pile contract length shall be driven as per plan unless piles reach refusal. Construction control requires a weap analysis with bearing graph.

East Abutment Pile Notes:

The contract length of 70 feet for the East Abutment piles is based on a cohesive soil classification, a total factored axial load per pile (PU) of 223 kips, and a geotechnical resistance factor (phi) of 0.65 for soil and 0.7 for rock end bearing. To account for soil consolidation under the new fill, the factored axial load includes a factored downdrag load of 43 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 for soil and 0.7 for rock end bearing. Piles are assumed to be driven from a start elevation at the bottom of prebore (prebore elevation varies, see Design Sheet No. 11 for additional information).

The required nominal axial bearing resistance for east abutment piles is 179 tons at the end of drive or retap. The pile contract length shall be driven as per plan unless piles reach refusal. Construction control requires a weap analysis with bearing graph.

Abutment piles are designed to accommodate downdrag force due to soil consolidation under the new earth fill. Piles shall be driven to 179 tons based on theoretical driving resistance. This includes 22 tons of resistance in and above the compressible layers, 30 tons resistance for downdrag forces and 127 tons resistance for dead and live load bearing capacity.

Notes:
Concrete Quantities are included on the Summary Quantities sheet.
Barrier rail not shown in details.
* Includes portion of maskwall below construction joint.

Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Abutment Details

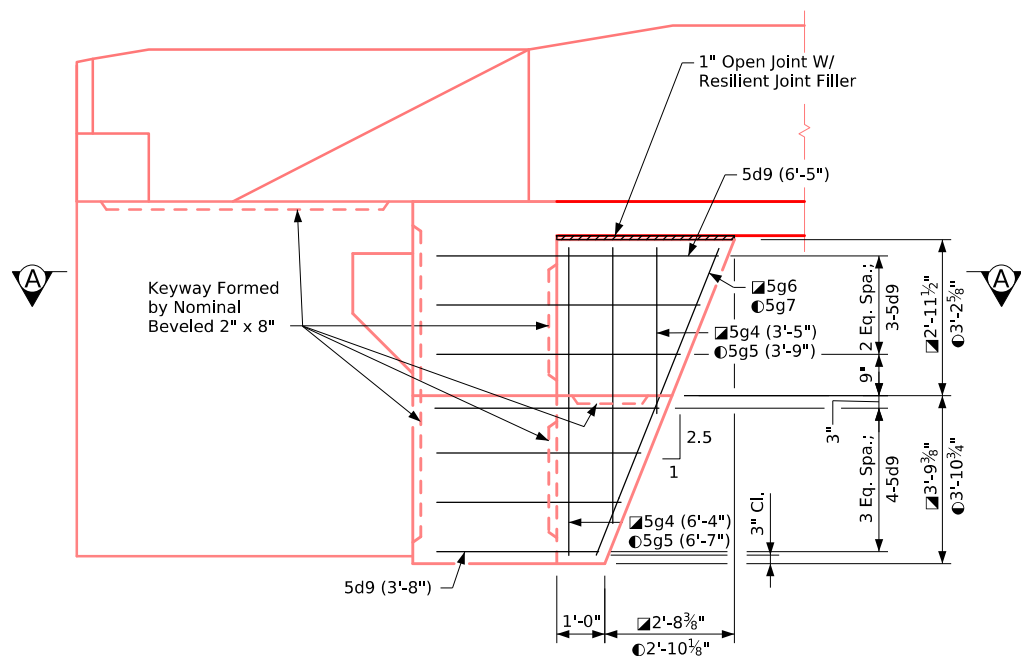
STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

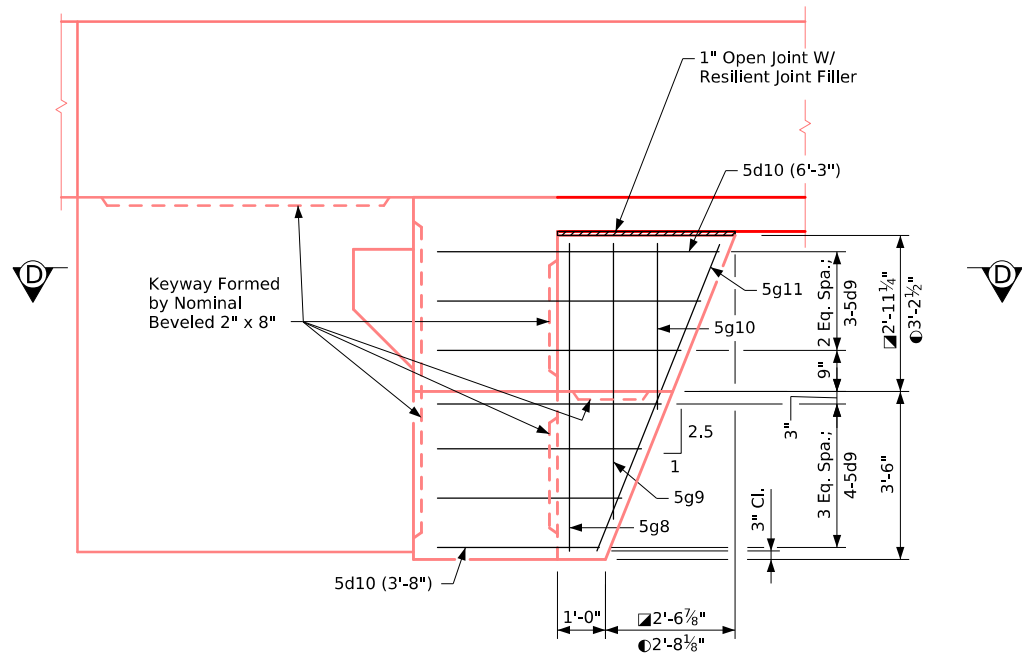
Design No. 226 Design Sheet No. 12 of 41 FHWA No. 041951



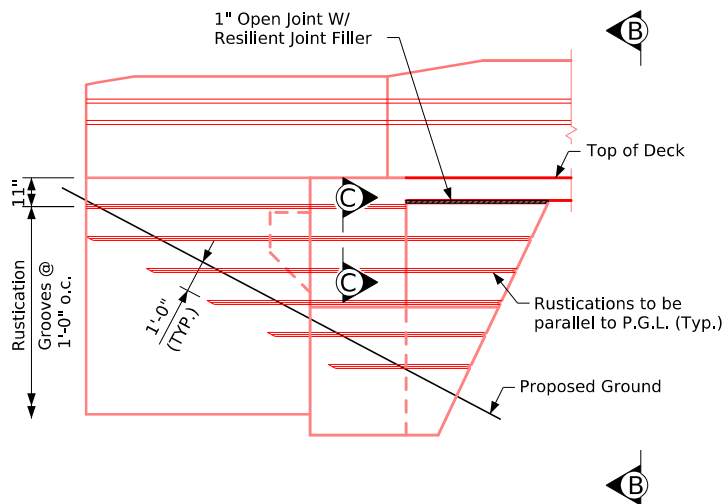


South Maskwall - West Abutment Shown
(East Abutment Similar)
(Other Reinforcing not Shown for Clarity)

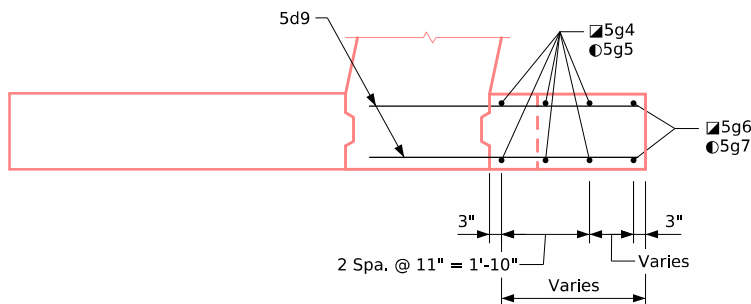
Note:
 ▣ W. Abut.
 ● E. Abut.



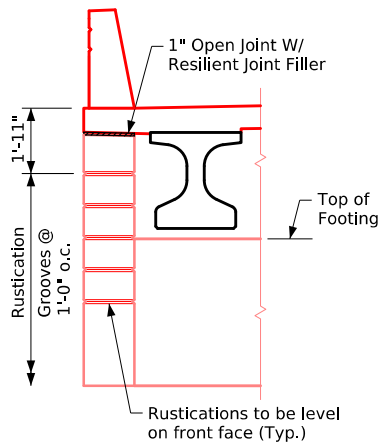
North Maskwall - East Abutment Shown
(West Abutment Similar)
(Other Reinforcing not Shown for Clarity)



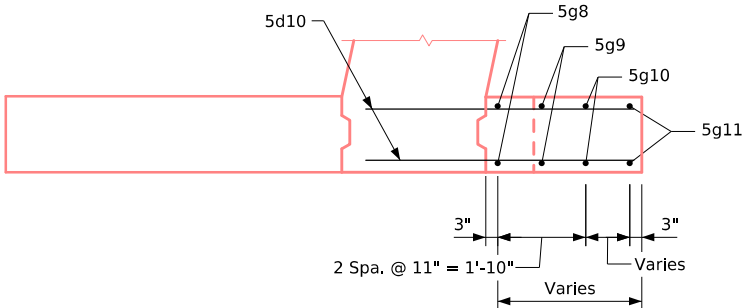
Abutment Rustication
(West Abutment Looking North)
(East Abutment Similar)



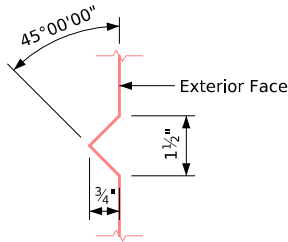
Section A-A



Section B-B



Section D-D



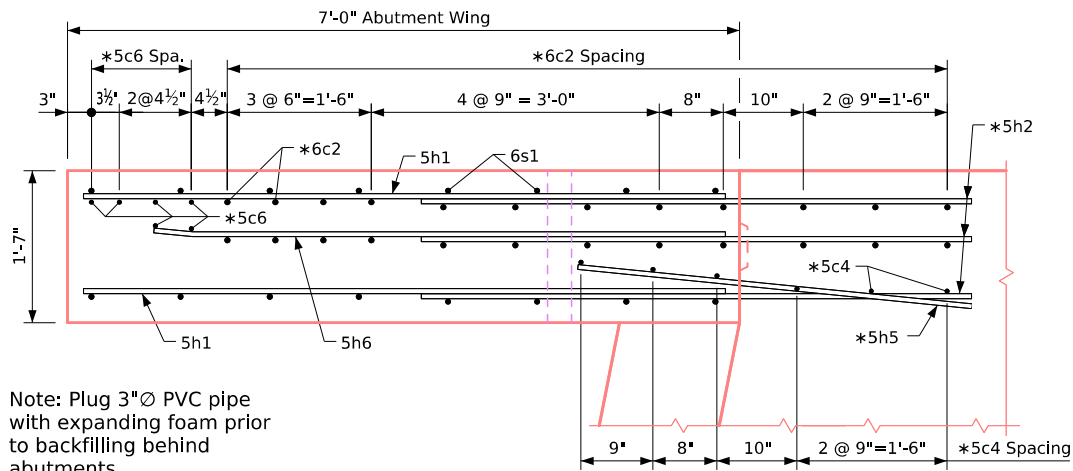
Section C-C

Notes:
 For barrier rail details, see Design Sheet Nos. 30 - 34.
 For concrete rustication notes, see Design Sheet 4.

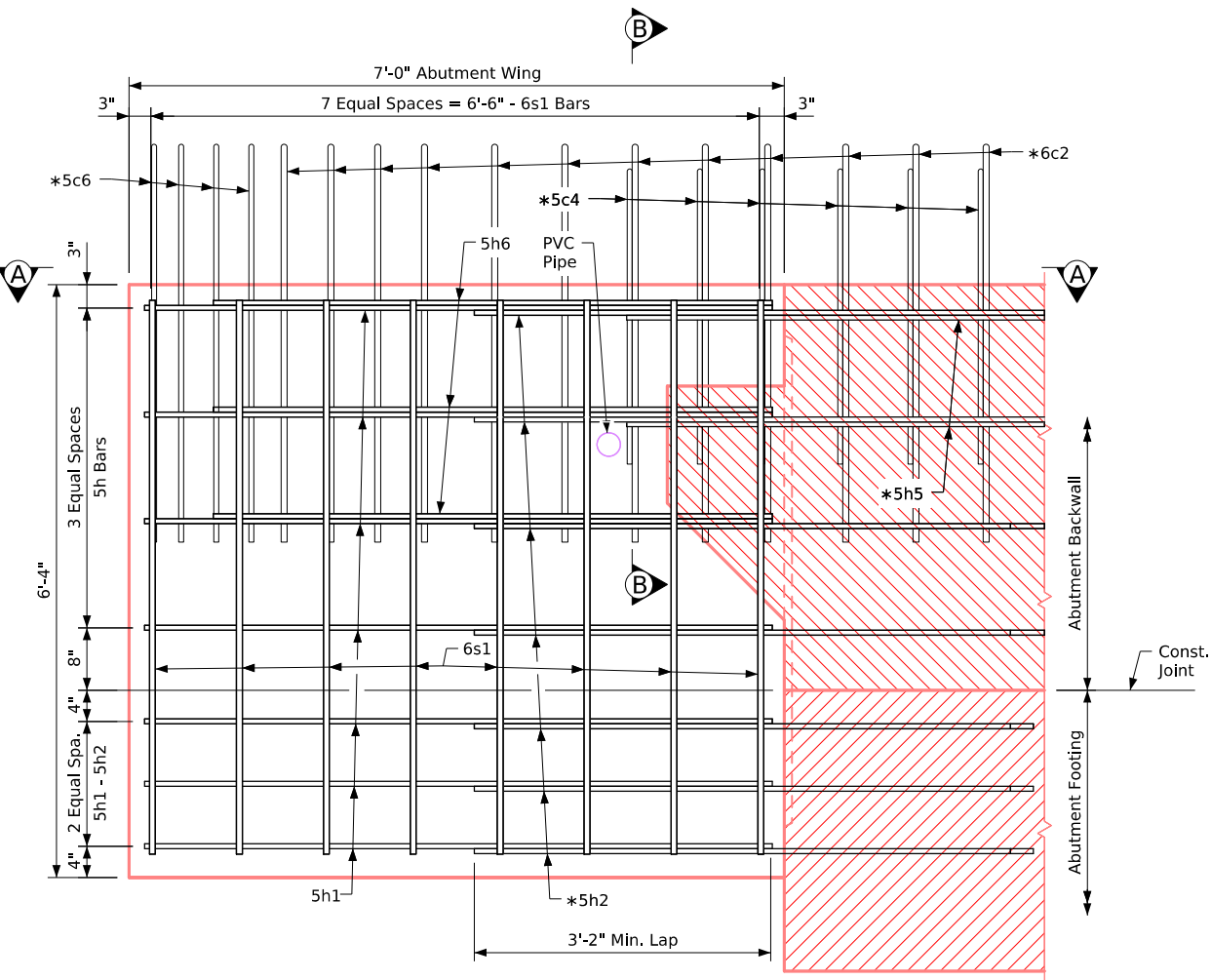
Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
 51'-0" & 76'-0" End Spans 97'-0" Interior Span
Abutment Details
 STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025
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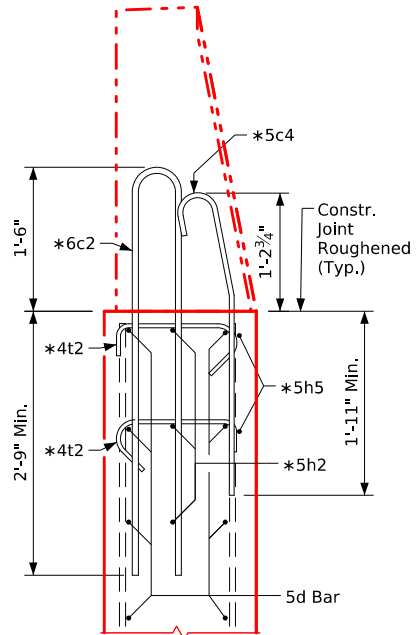
Correction 04-14: Added Referral Note to Summary Quantities Sheet.
Issued 02-08.
Revised 08-2024: Removed improperly placed bar label 6c1 in "Section B-B" details.
MiscellaneousBridges.dgn - 2111 - This Sheet Re-Issued 11-2023. Sheet Format Update.



View A-A



South Wing - Elevation View
(Shown at W. Abut., E. Abut. Similiar)



Section B-B

*Barrier rail end section bars to be placed with abutment wing and abutment.

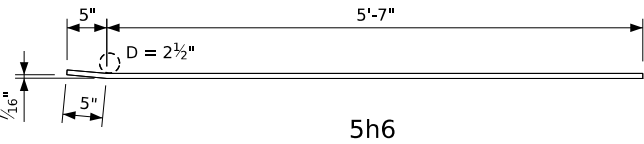
See Barrier Rail End Section Sheet on Design Sheet No. 33 for details of reinforcing bars 6c2, 5c4, 5c6 and 4t2.

See Abutment Details Sheet on Design Sheet No. 11 for details of reinforcing bars 5h2 and 5h5.

Reinforcing Bar List - One Abut. Wing

Bar	Location	Shape	No.	Length	Weight
5h1	Horizontal Both Faces		14	6'-8"	97
5h6	Horizontal Wingwall		3	6'-0"	19
6s1	Vertical Both Faces		16	6'-0"	144

Epoxy Reinforcing Total Weight (lbs.) 260



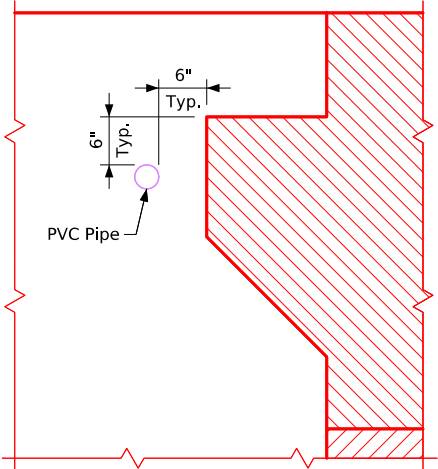
Bent Bar Details

Note: All Dimensions are out to out. D = Pin Diameter

Concrete Placement Summary

Section	Total
One Abutment Wing	2.6
Total (cu. yds.)	2.6

Note: Concrete and reinforcing steel quantities are included on the Summary Quantities Sheet.



PVC Pipe Location

Note: Plug 3"Ø PVC pipe with expanding foam prior to backfilling behind abutments.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

South Wing Details

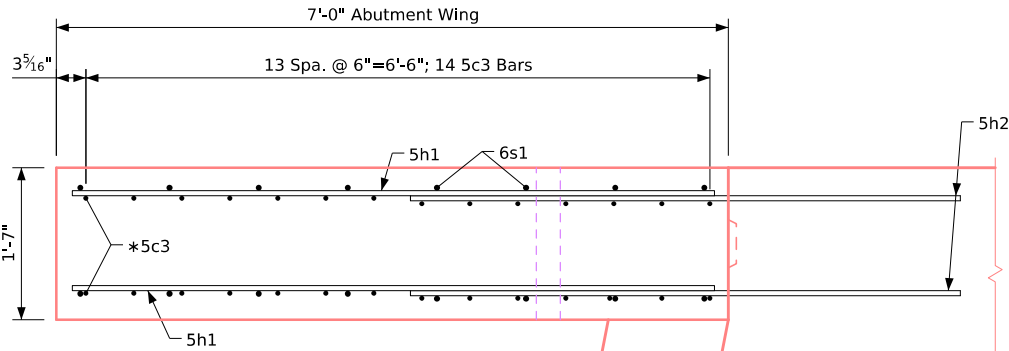
STA. 1131+93.78, 42.00' Rt. (C I-80 Existing) Turn-in Date: October, 2025

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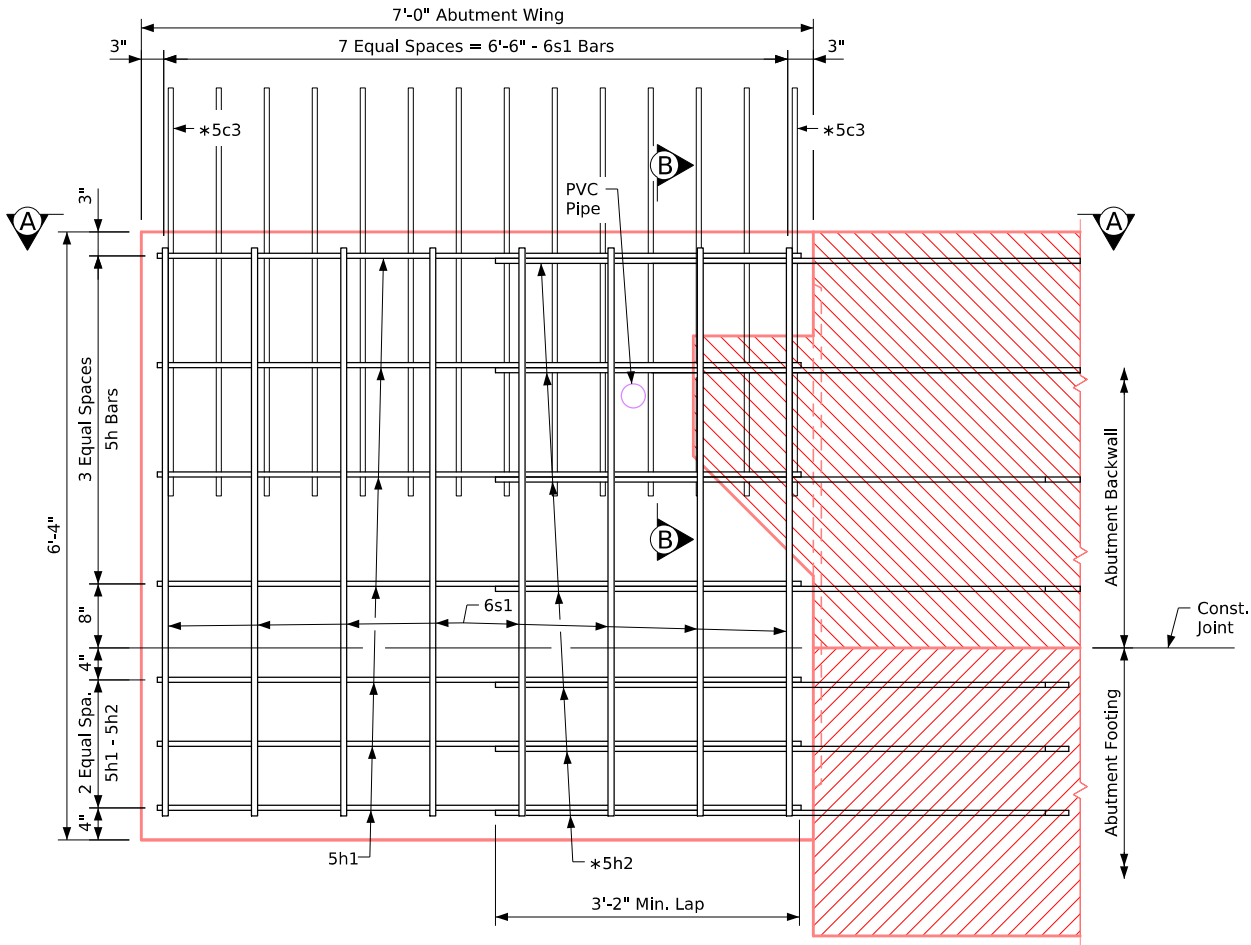
Design No. 226 Design Sheet No. 14 of 41 FHWA No. 041951

Correction 04-14: Added Referral Note to Summary Quantities Sheet.
Issued 02-08.
Revised 08-2024: Removed improperly placed bar label 6c1 in "Section B-B" details.
MiscellaneousBridges.dgn - 2111 - This Sheet Re-Issued 11-2023. Sheet Format Update.



Note: Plug 3"Ø PVC pipe with expanding foam prior to backfilling behind abutments.

View A-A



North Wing - Elevation View
(Shown at E. Abut., W. Abut. Similiar)

Reinforcing Bar List - One Abut. Wing

Bar	Location	Shape	No.	Length	Weight
5h1	Horizontal Both Faces		14	6'-8"	97
6s1	Vertical Both Faces		16	6'-0"	144
Epoxy Reinforcing Total Weight (lbs.)					241

Concrete Placement Summary

Section	Total
One Abutment Wing	2.6
Total (cu. yds.)	2.6

Note: Concrete and reinforcing steel quantities are included on the Summary Quantities Sheet.

Notes:
See Abutment Details Sheet on Design Sheet No. 11 for details of reinforcing bars 5h2 and 5h5.
*For details of 5c3 bars and barrier rail reinforcing, see Details on Design Sheet No. 30.
For PVC Pipe Location detail, see Design Sheet No. 14.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

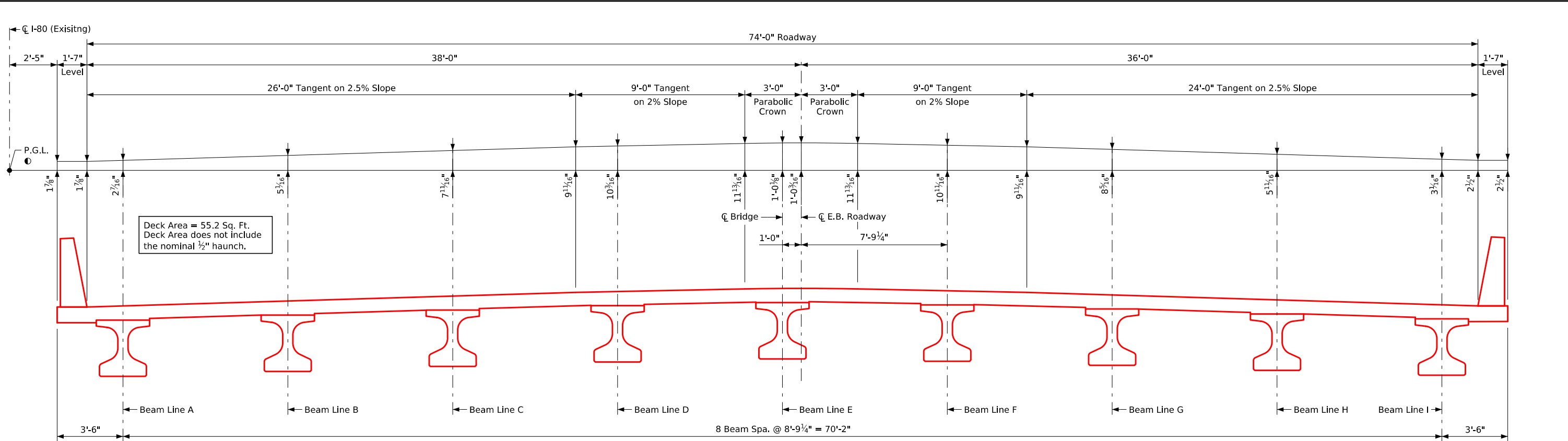
North Wing Details

STA. 1131+93.78, 42.00' Rt. (C I-80 Existing)Turn-in Date: October, 2025

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Design No. 226Design Sheet No. 15 of 41FHWA No. 041951

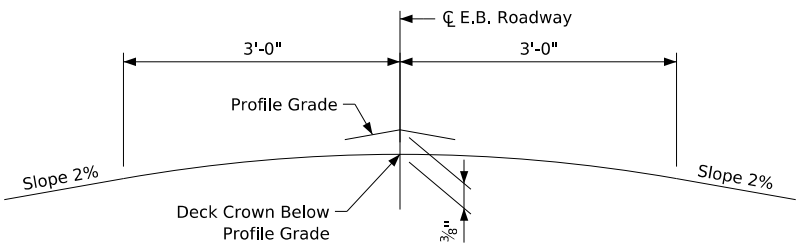


Typical Section

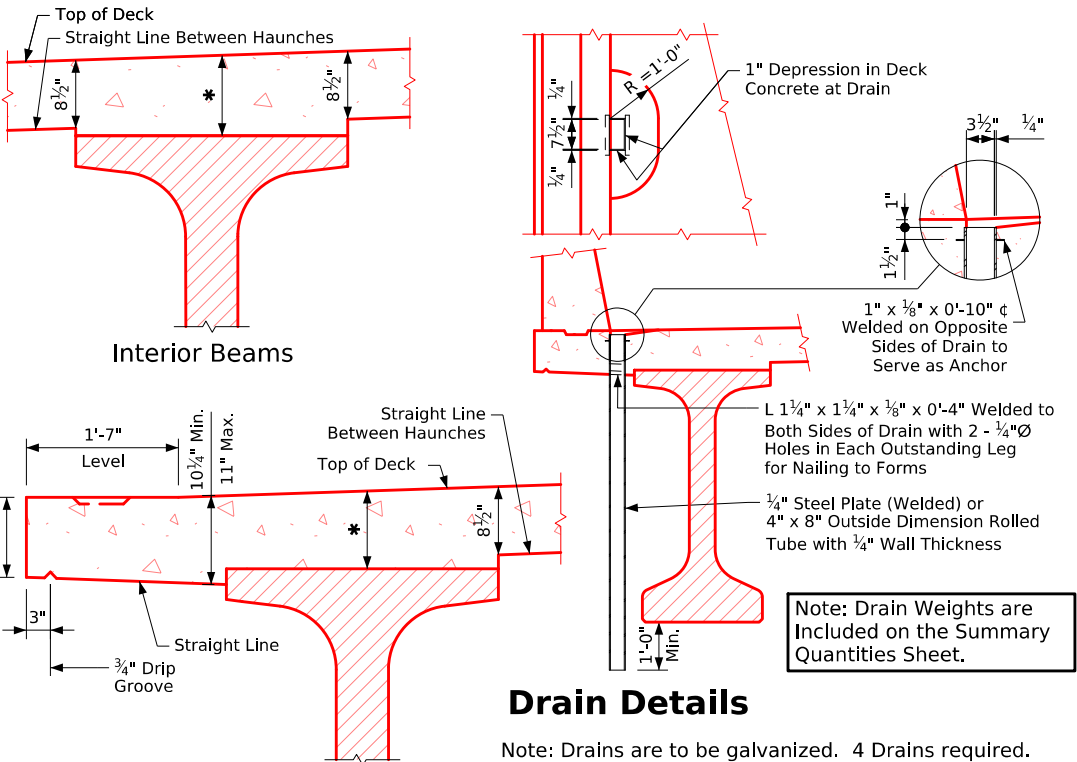
Note: For details of Intermediate Diaphragm see Design Sheet No. 25 & 26.
● For P.G.L. Detail, see Design Sheet No. 17.

Superstructure Notes:

The bridge deck as shown includes 3/4" 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" 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 3/4" clear below top of deck. Bottom transverse reinforcing steel is to be parallel to and 1 1/2" 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.
Transverse deck reinforcing may be spliced with one lap located as follows:
Top bar - lap midway between beams (min. lap = 2'-10").
Bottom bars - lap over beams (min. lap = 3'-7").
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.
Cost for bearing material is to be included in the price bid for "Pretensioned Prestressed Concrete Beams".



Parabolic Crown Template



Drain Details

Note: Drains are to be galvanized. 4 Drains required. See "Situation Plan" on Design Sheet No. 5 for location. Weight of drains is included in the quantity for "Structural Steel". Weight is based on rolled tube.

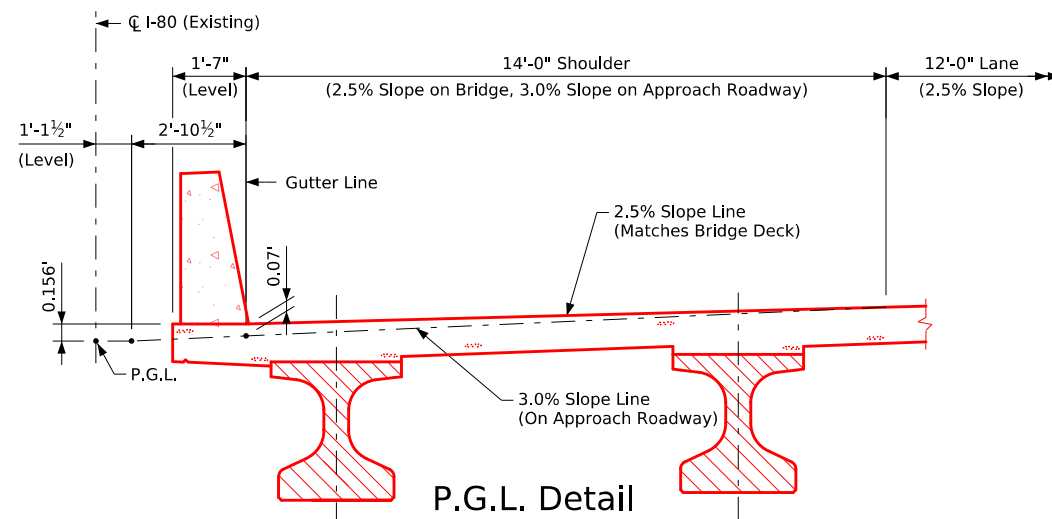
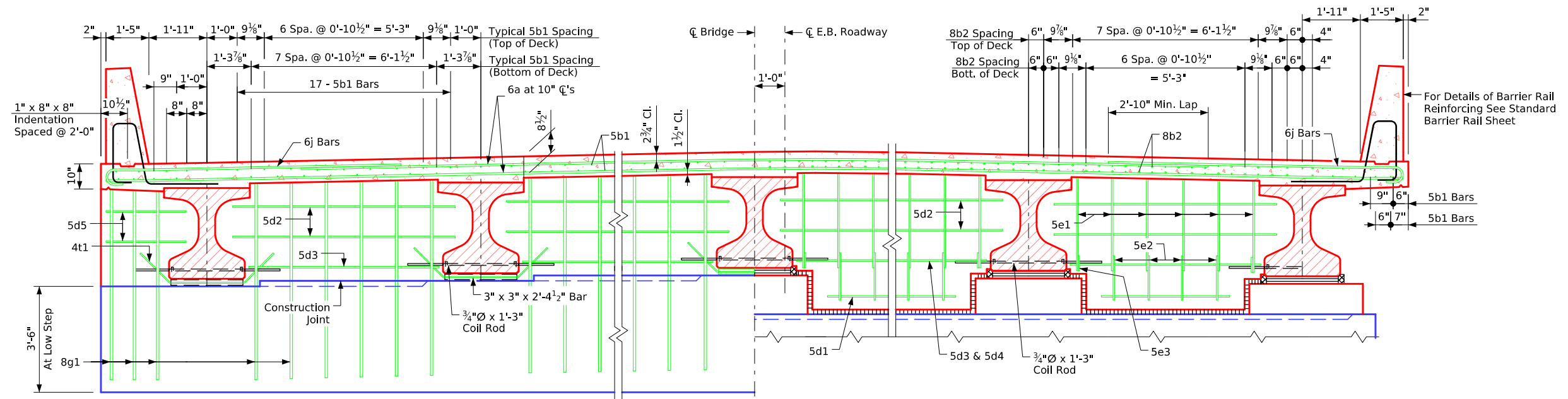
Data for One Drain	
Beam Size	BTB
Drain Weight (lbs.)	92
Drain Length (ft.)	4'-9 3/4"

Typical Deck and Haunch Detail

* For Deck Thickness Over Beams See "Haunch And Camber Details" on Design Sheet No. 20.



Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
51'-0" & 76'-0" End Spans 97'-0" Interior Span
Superstructure Details
STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 16 of 41 FHWA No. 041951

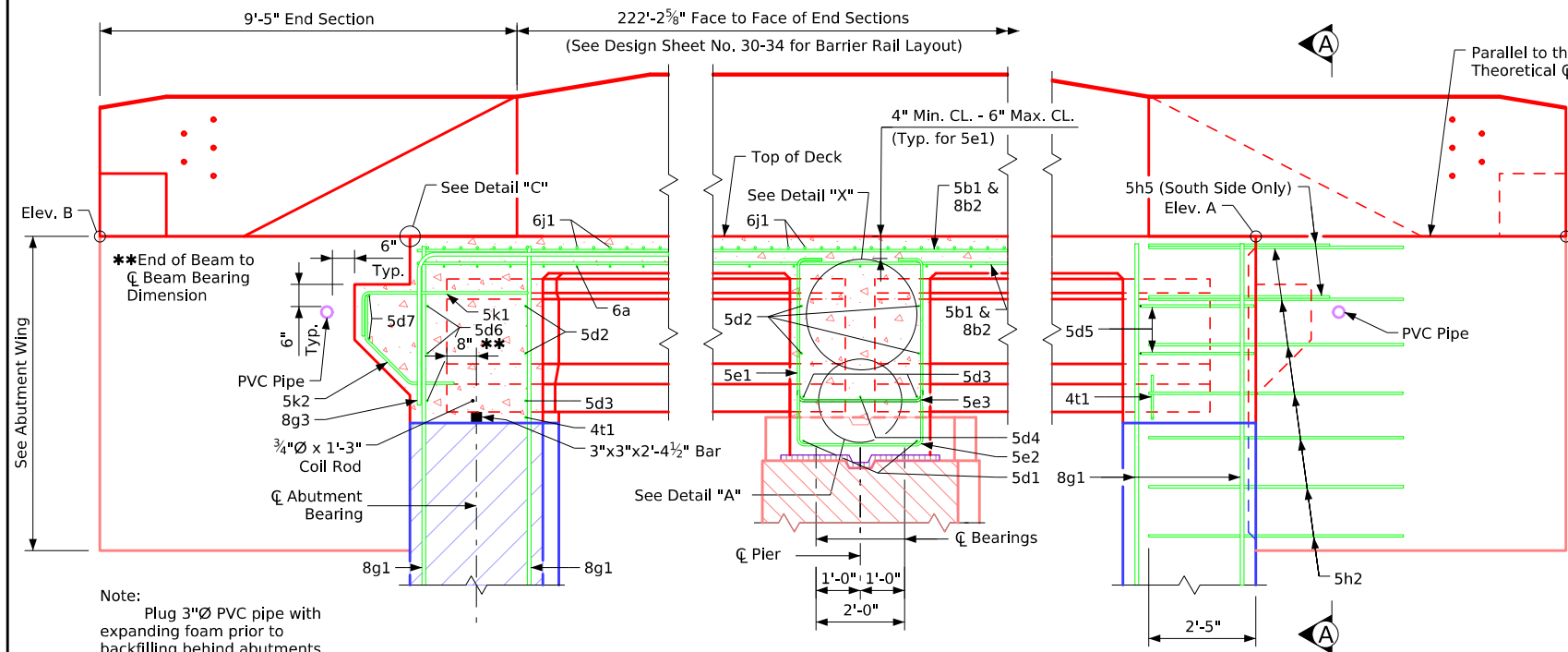


Note:
The P.G.L. is located at CL I-80 (Existing). The shoulder transitions from a 3.0% cross slope on the west approach roadway to 2.5% on the bridge, and back to 3.0% on the east approach roadway. However, the P.G.L. location does not change and is always located based on the 3.0% cross slope line. The result is that the P.G.L. is 0.156' below the level top of bridge deck under the median bridge barrier. See detail above.

Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
51'-0" & 76'-0" End Spans 97'-0" Interior Span
Superstructure Details
STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 17 of 41 FHWA No. 041951

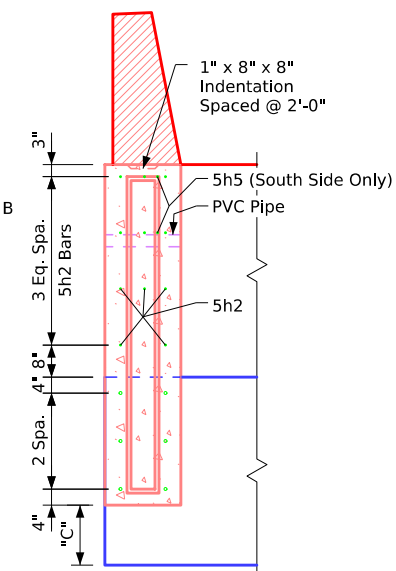


Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

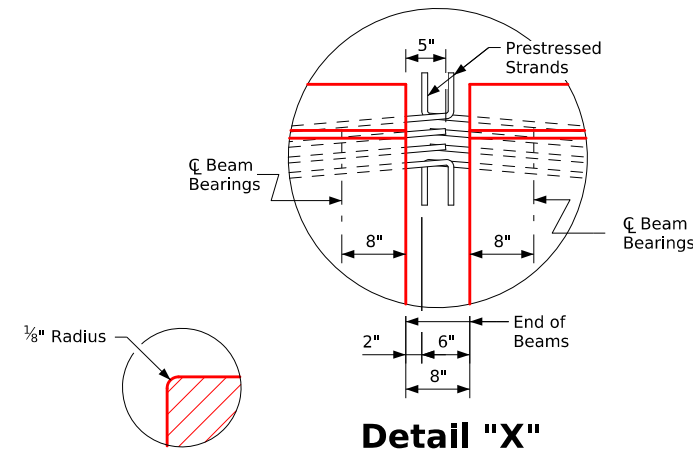


Part Longitudinal Section Near Gutter

(South Side Shown)
(For details of Intermediate Diaphragm see Design Sheet Nos. 25 & 26)

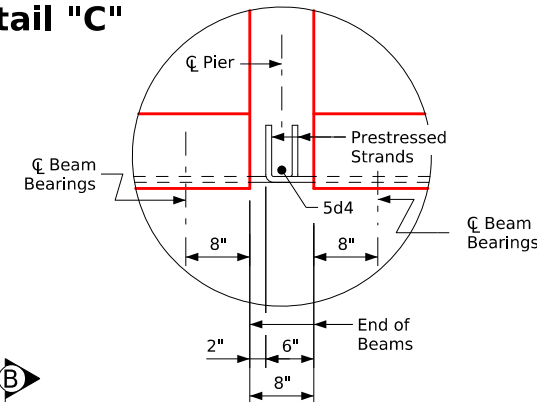


Section A-A

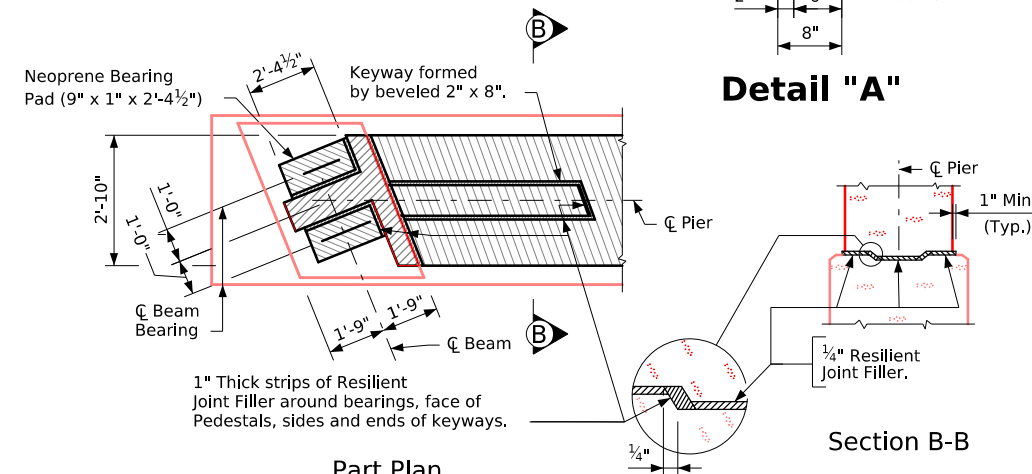


Detail "X"

Detail "C"

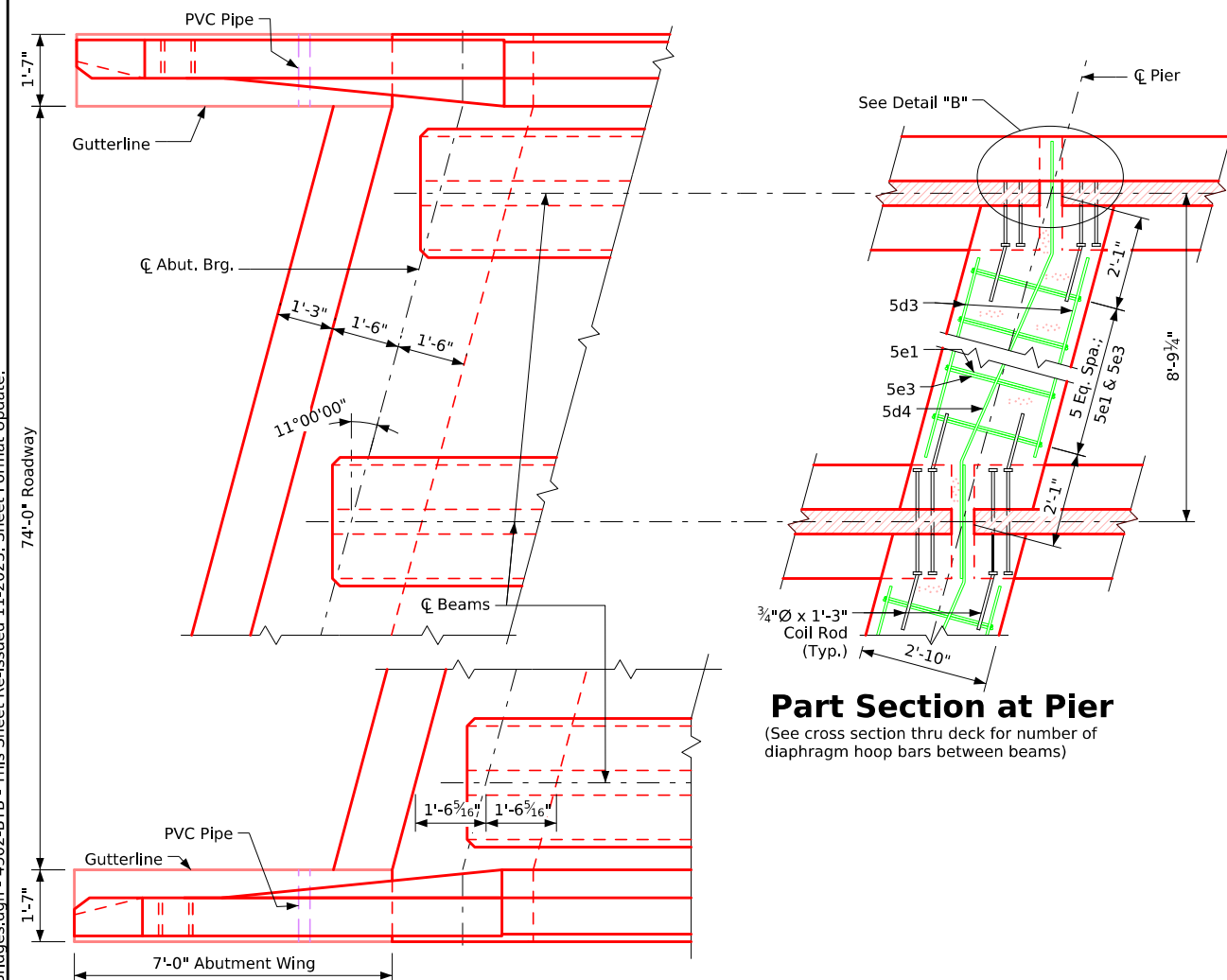


Detail "A"

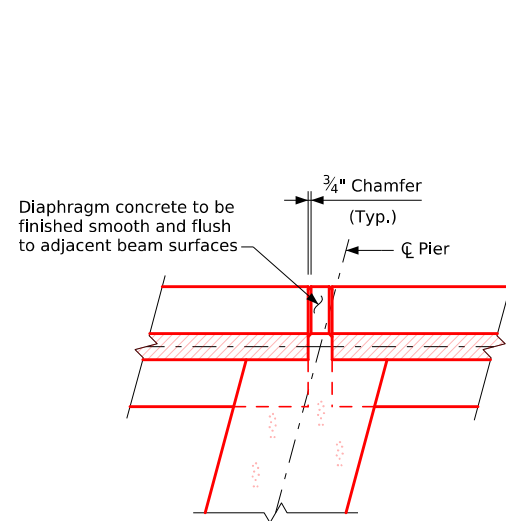


Part Plan

Top of Fixed Pier Details

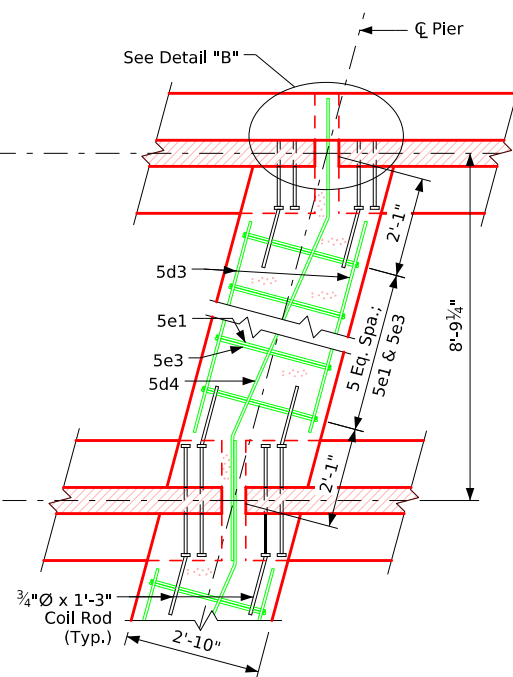


Part Plan



Detail "B"

Part Plan at Ends of Pier Diaphragm



Part Section at Pier

(See cross section thru deck for number of diaphragm hoop bars between beams)

Table of Wingwall Elevations			
Location	Dim "C"	Elev. A	Elev. B
S.W. Corner	1'-6 $\frac{3}{4}$ "	938.06	938.18
N.W. Corner	1'-3 $\frac{1}{2}$ "	937.77	937.89
S.E. Corner	1'-4 $\frac{3}{4}$ "	933.35	933.17
N.E. Corner	11 $\frac{1}{2}$ "	932.93	932.75

Design For 11°00'00" Skew (LA)

**224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge**

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Abut. & Pier Diaphragm Details

STA. 1131+93.78, 42.00' Rt. (C/L-80 Existing) Turn-in Date: October, 2025

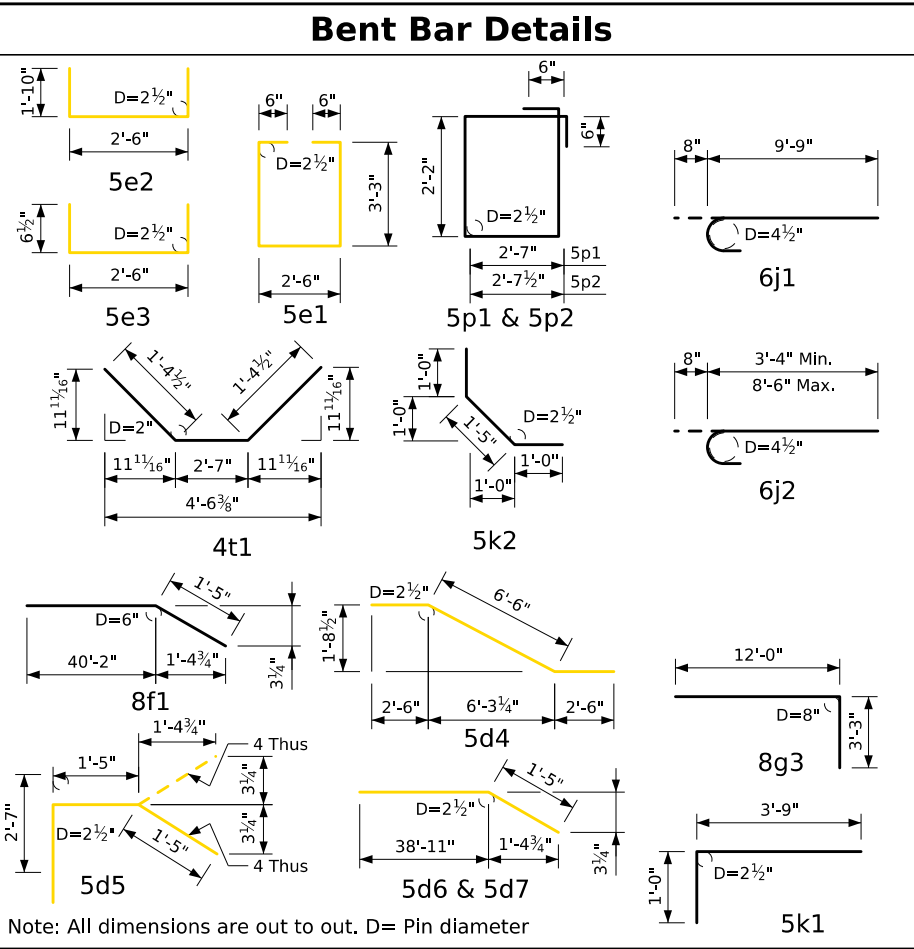
Polk County

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Design No. 226 Design Sheet No. 18 of 41 FHWA No. 041951

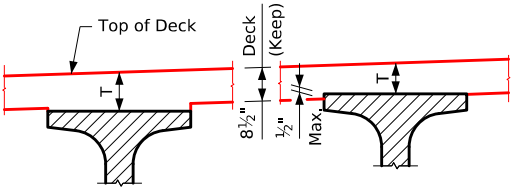
Revised 07-15: Changed Concrete Placement Note to Account for the Possible Addition of a Retarding Admixture to the Concrete.
Issued 02-08.
BTIntegralBridges.dgn - 4516-BTB - This Sheet Re-Issued 11-2023. Sheet Format Update.

Reinforcing Bar List						
Epoxy Coated Reinforcing	Bar	Location	Shape	No.	Length	Weight
	6a1	Deck Transv. Top		258	37'-4"	14,467
	6a2	Deck Transv. Top		258	28'-7"	11,076
	6a3	Deck Transv. Top		26	Varies	1,320
	6a6	Deck Transv. Bottom		28	Varies	1,347
	6a7	Deck Transv. Bottom		6	Varies	288
	6a8	Deck Transv. Bottom		516	40'-3"	31,195
	5b1	Deck Longit. Top & Bottom		966	39'-10"	40,134
	8b2	Deck Longit. Top & Bottom at Piers		344	23'-8"	21,737
	5d1	Pier Diaph. Longit.		32	5'-0"	167
	5d2	Pier & Abut. Diaph. Longit.		96	8'-1"	809
	5d3	Pier & Abut. Diaph. Longit.		48	6'-2"	309
	5d4	Pier Diaph. Longit.		16	11'-6"	192
	5d5	Abut. Diaph. Ends		8	5'-5"	45
	5d6	Abut. Diaph. Longit. B.F.		12	40'-4"	505
	5d7	Paving Notch Longit.		8	40'-4"	337
	5d9	Maskwall Horiz.		28	Varies	147
	5d10	Maskwall Horiz.		28	Varies	145
	5e1	Pier Diaph. Hoops		96	10'-0"	1,001
	5e2	Pier Diaph. Ties		64	6'-2"	412
	5e3	Pier Diaph. Ties		32	3'-7"	120
	8f1	Abut. Footing Longit. Both F.		36	41'-7"	3,997
	8g1	Abut. Vert. Both F.		256	7'-1"	4,842
	8g3	Abut. Diaph. Vert. Back F.		134	15'-3"	5,456
	5g4	Maskwall Vert.		6	Varies	31
	5g5	Maskwall Vert.		6	Varies	32
	5g6	Maskwall Vert.		2	6'-9"	14
	5g7	Maskwall Vert.		2	7'-2"	15
	5g8	Maskwall Vert.		4	6'-1"	25
	5g9	Maskwall Vert.		4	5'-6"	23
	5g10	Maskwall Vert.		4	3'-2"	13
	5g11	Maskwall Vert.		4	6'-6"	27
	5h2	Abut. to Wing Anchor		70	5'-9"	420
	6j1	Top of Deck Transv. (At Rail)		1268	10'-5"	19,839
	6j2	Top of Deck Transv. (At Rail)		10	Varies	99
	5k1	Paving Notch		134	4'-9"	664
	5k2	Paving Notch		134	3'-5"	478
	5p1	Abut. Hoops		240	10'-6"	2,628
	5p2	Abut. Hoops at Ends		24	10'-7"	265
	4t1	Under Beams at Abutments		18	5'-4"	64
Epoxy Reinforcing Steel Total Weight (lbs.)						164,685
Non-Coated	#2	Pile Spiral		22	38'-6"	141
		Spiral Spacers, L ² / ₁₆ " x 7/ ₁₆ " x 1/ ₈ " x 0.70		66	1'-10"	85
Non-Coated Reinforcing Steel Total Weight (lbs.)						226



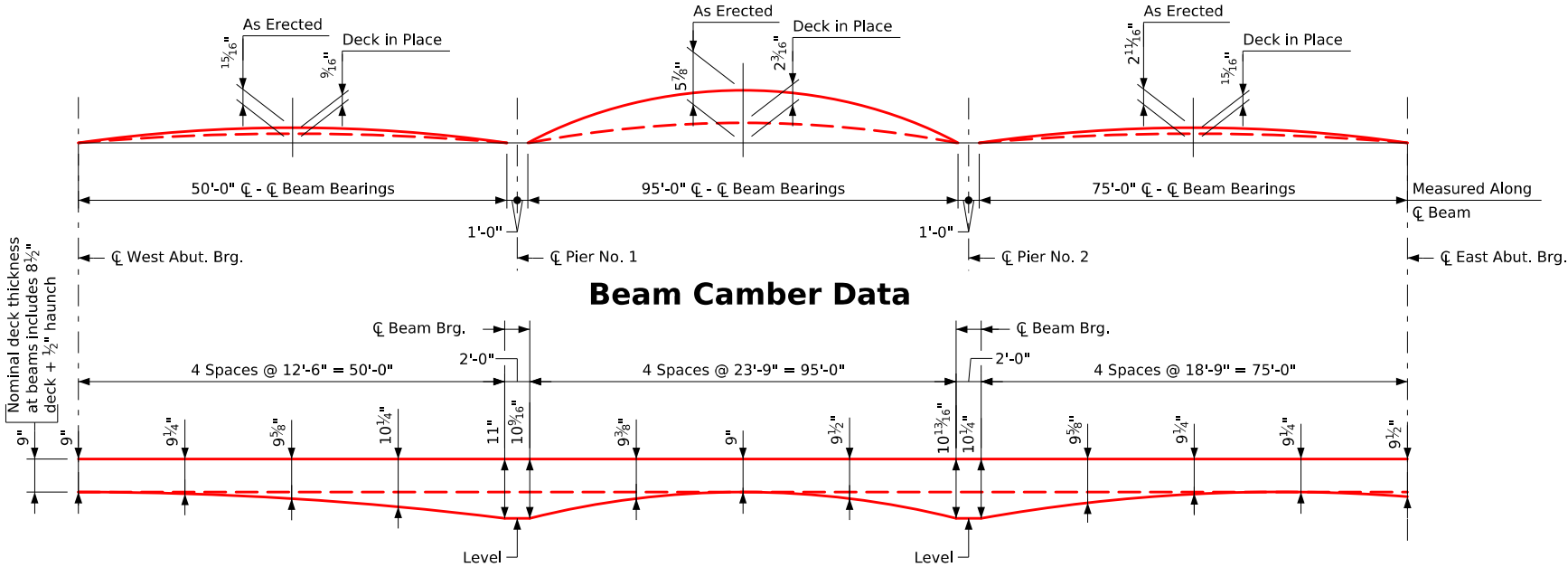
Concrete Placement Quantities	
Location	Quantity
Section 1, Deck & Abut. Diaph. **	121.0
Section 2, Deck	154.3
Section 3, Deck & Abut. Diaph. **	173.4
Section 4, Deck & Pier Diaph.	77.7
Section 5, Deck & Pier Diaph.	77.7
Total (Cu. Yds.)	604.1

Note:
Concrete and reinforcing steel quantities are included on the Summary Quantities Sheet.
** Includes portion of maskwall above construction joint.



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.



Deck Thickness at Beams (T)

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Superstructure Details

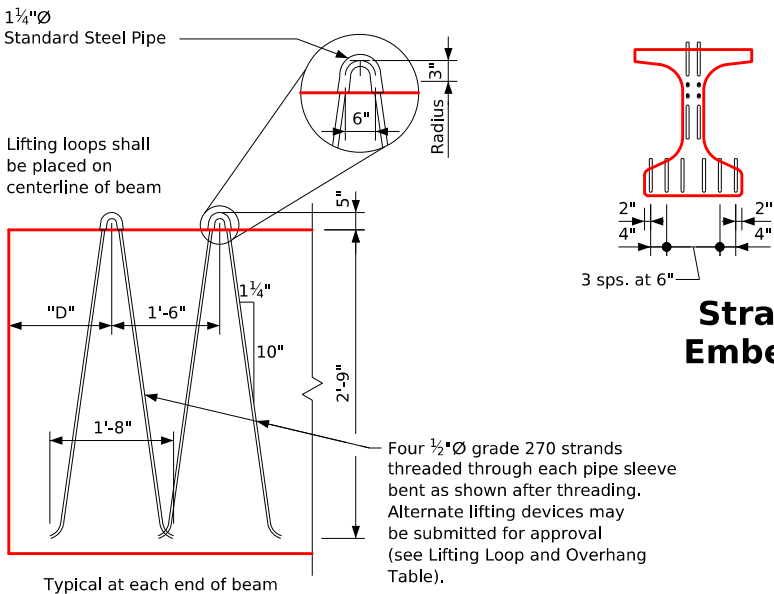
STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

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Design No. 226Design Sheet No. 20 of 41FHWA No. 041951

Correction 12-13: Coil Tie Detail was Changed to Reflect the Distance Between Coil Tie Anchors Embedded
Revised 10-2024: Revised "At Release" and "After Losses" Camber Values for BTB85 to BTB95. Revised "Reinforcing Bar List" and "Reinforcing Steel weight in the "BTB Beam Data" table for BTB55, BTB60, BTB65, BTB70, and BTB75 beams, due to changes of 6b3,6b4, 4c1, and 4e1 bars.
Issued 05-04, Beams.dgn - 4750 - This Sheet Re-Issued 04-2024. Sheet Format Update.

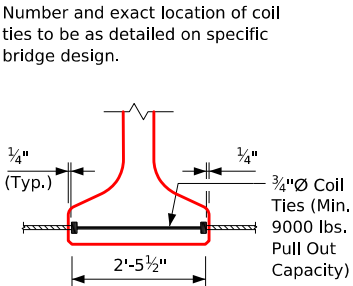


Lifting Loop Detail

Lifting Loop and Overhang Table				
Beams	Lifting Loops Each End	# of Strands Per Loop	D	Beam Overhang (ft.)
BTB50, BTB75	1	4	2'-0"	**
BTB95	2	4	2'-6"	11

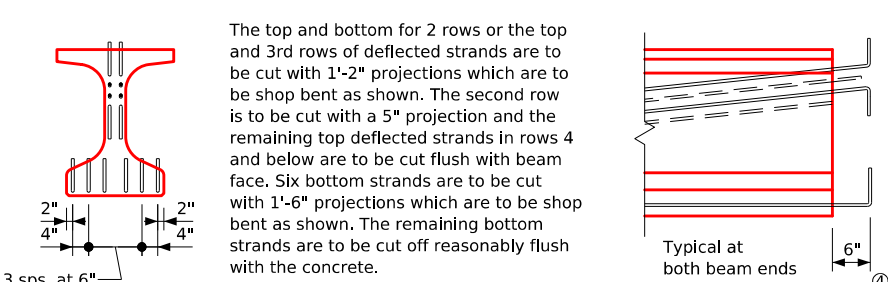
** In accordance with Article 2407.03, K of the Standard Specifications.

Lifting loops shall carry loads equally.



Coil Tie Detail

Reinforcing Bar List							
Beam	BTB50	BTB75	BTB95	Beam	BTB50	BTB75	BTB95
Bar	Shape	No.	Length	Bar	No.	Length	No.
5a1		12	27'-3"	5a1	12	39'-9"	12
5a2		---	---	5a2	---	---	6
5b1		37	7'-9"	5b1	63	7'-9"	83
6b3		36	4'-3"	6b3	36	4'-3"	32
6b4		4	3'-7"	6b4	8	3'-7"	16
4c1		69	2'-7"	4c1	93	2'-7"	117
4d1		57	6'-5"	4d1	83	6'-5"	105
4e1		24	3'-2"	4e1	24	3'-2"	26
4h1		4	8'-0"	4h1	4	8'-0"	4



Strand Projection at Beam Ends When Embedded in Concrete End Diaphragms

Design Stresses:

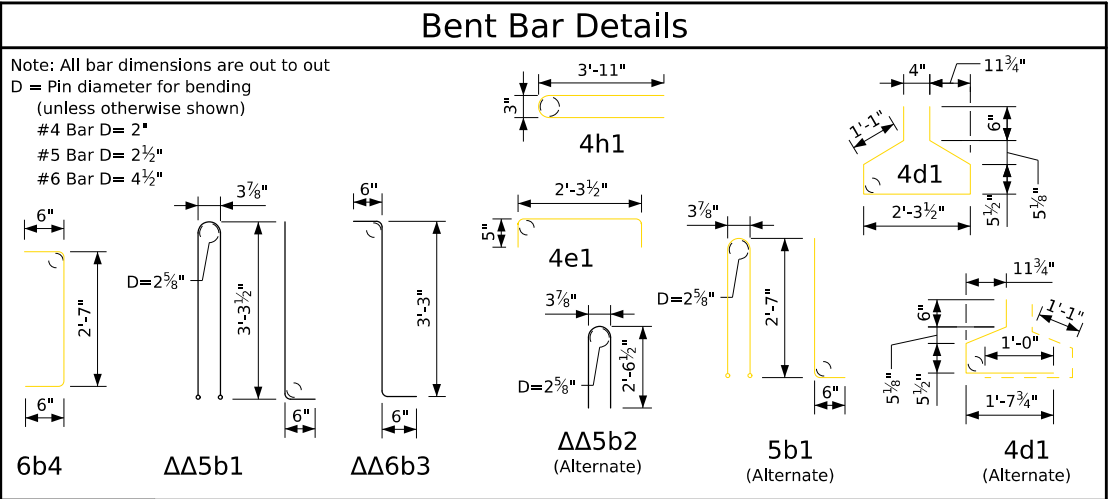
Design stresses for the following materials are to be in accordance with AASHTO LRFD Bridge Design Specifications, Series of 2017.
Reinforcing steel in accordance with Section 5, Grade 60.
Concrete in accordance with Section 5.
Prestressing steel in accordance with Section 5, Grade 270.

Specifications:

Construction: Standard Specifications of the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.
Design: AASHTO LRFD, Series of 2017 with minor modifications.

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.



BTB Beam Data

BTB Beam	Span Length ℄-℄ Bearing	Overall Beam Length (L)	Concrete Strength		Strand Size Dia. (In.)	Number of Strands		Total Initial Prestress (kips) ③	Hold Down Force (kips)	Camber (in.) ⑤		Deflection (in.) Δ _D		Permissible Maximum Spacing	Weight (tons)	Concrete (cu. yd.)	Reinforcing Steel (weight lb.)
						Straight	Deflected					Immediate ① (elastic) Δ _i	Time ② (plastic) Δ _T				
			f'ci (ksi.)	f'c (ksi.)						Steel Diaphragm	Steel Diaphragm						
												At Release	After Losses	HL-93 Loading			
BTB50	50'-0"	51'-4"	4.50	5.00	0.60"	14	—	596	—	0.51"	0.94"	0.32	0.09	8'-9 1/4"	16.9	8.3	1327
BTB75	75'-0"	76'-4"	5.50	6.50	0.60"	22	6	1191	20.6	1.67"	2.67"	1.46	0.36	8'-9 1/4"	25.1	12.4	1868
BTB95	95'-0"	96'-4"	8.00	9.50	0.60"	34	10	1871	20.1	3.68"	5.88"	3.30	0.83	8'-9 1/4"	31.7	15.7	2333

- ① Deflections at mid-span due to weight of deck and diaphragm. The deflections shown are for a deck (8.5") and haunch (1.5") weight of:
0.99 kips/ft. for 8'-9 1/4" 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_D , due to weight of deck and diaphragms for detailing purpose:
(A) Δ_D=Δ_i +Δ_T for simple span.
(B) Δ_D=Δ_i + 3/4Δ_T for end spans of continuous bridge.
(C) Δ_D=Δ_i + 1/2Δ_T for interior spans of continuous bridge.
- ③ Total initial prestress is based on 72.6% f's, f's= 270 ksi. and As= 0.217 in.².
- ④ Includes partial length debonded strands, see individual Beam Sheets for location and details.
- ⑤ Calculated design cambers are based on multipliers developed from research in Iowa.

Note: All mild reinforcing steel can be epoxy coated at Contractor's option without modification to bar length or details at no additional cost to the State.

ΔΔ 5b1 and 6b3 bars to be epoxy coated

* 6b3 and 6b4 bars to be used in pairs

● Standard bar length was increased to satisfy the required projection into the deck.

Note:
For modified stirrup extensions, see "Bent Bar Details" and beam details sheets for dimensions and locations.

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.²) 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 I.M.570.
Bearings shall be as detailed on other design sheets.
Beams to be used in bridges made continuous by the poured in place deck, are to be at least 28 days old before the deck 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.
If sole plate is required for bearing, sole plate is to be set in forms when beam is cast and formed out below to exclude concrete as detailed on the Bearing Sheet.
If stub abutments are used, all strands at the ends of beams at stub abutments shall be cut off reasonably flush with the concrete.
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.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

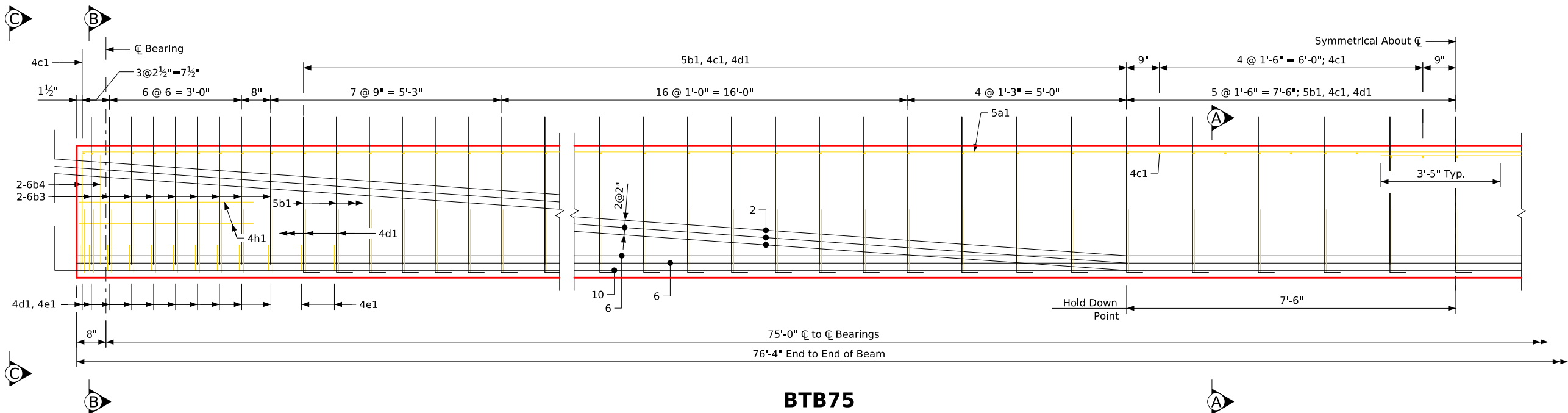
BTB Beam Details

STA. 1131+93.78, 42.00' Rt. (℄ I-80 Existing)Turn-in Date: October, 2025

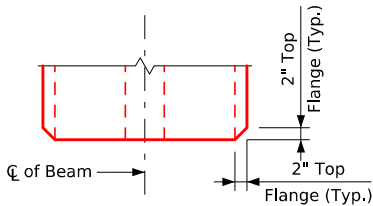
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 21 of 41FHWA No. 041951

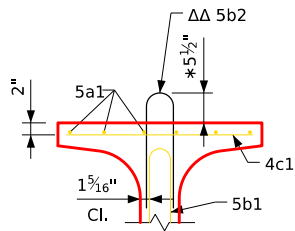


BTB75



Top View

The top flange beam corners are to be chamfered 2" as shown at both ends of the beam.



Section A-A (Alternate)

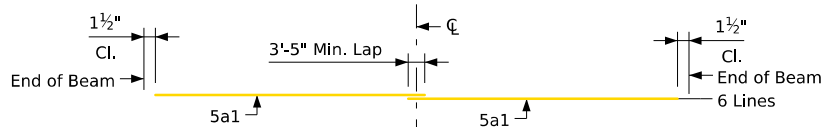
See Alternate Bar Note on Design Sheet No. 21.

Area = 631.7 in.²
 $\bar{y}_b = 17.14$ in.
 $I = 99,980$ in.⁴

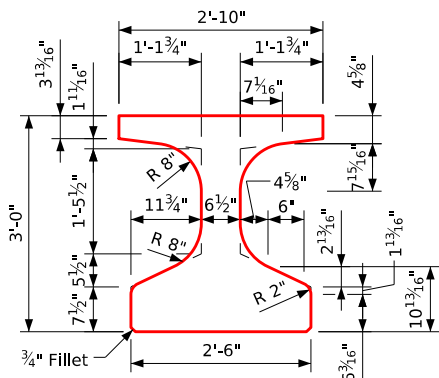
Beam Section Properties

Note: Stirrup Extension.

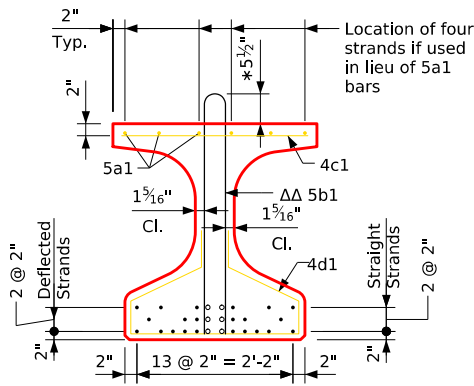
* The standard 5" projection has been increased.



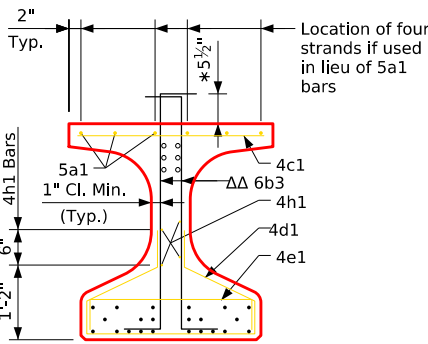
Top Flange Longitudinal Bar Layout



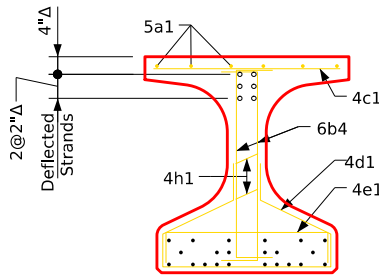
BTB Beam Cross Section



Section A-A



Section B-B



View C-C

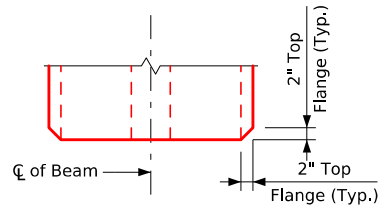
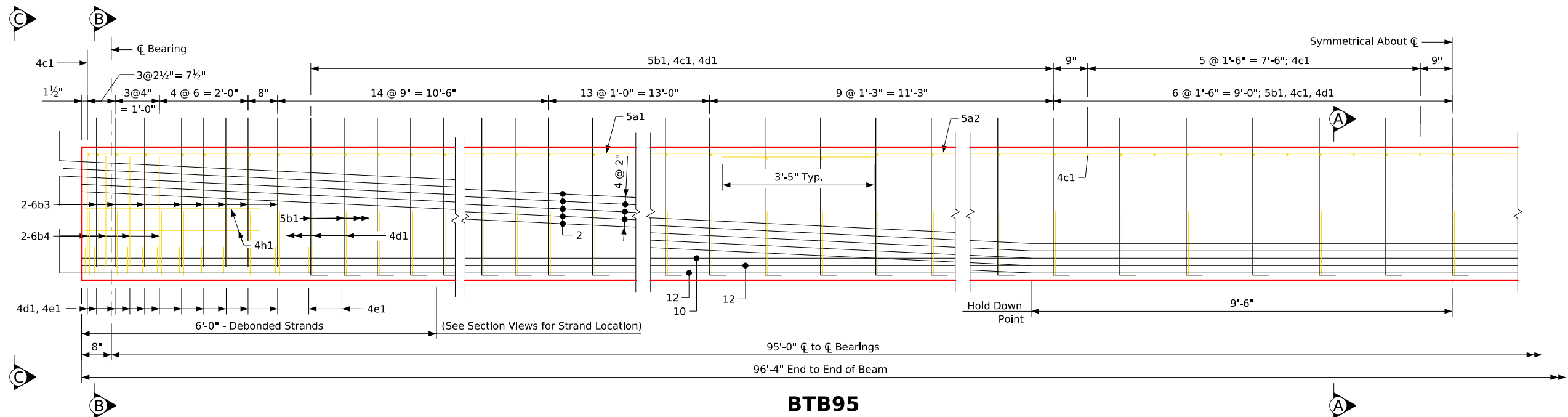
° Deflected Strands
Δ Dimensions at End of Beam
ΔΔ Epoxy Coated Bars

Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge
51'-0" & 76'-0" End Spans 97'-0" Interior Span
BTB75 Beam Details
STA. 1131+93.78, 42.00' Rt. (C/L-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 23 of 41 FHWA No. 041951

Revised 10-2024: Added one set of 6b3, 4d1, 4e1 to each beam end and revised rebar spacing.
Issued 02-208.
Beams.dgn - 4760 - This Sheet Re-Issued 04-2024. Sheet Format Update.

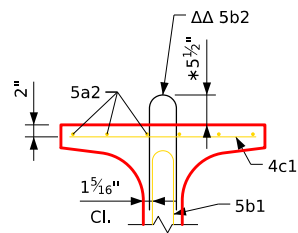
FILE NO. 32061	ENGLISH	DESIGN TEAM DLO/KD/TMS	Bulb Tee "B" Beam - 75'-0" Span	Standard Sheet 4760 (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(087)139--03-77	SHEET NUMBER V.23
4:53:56 PM	9/15/2025	ESORENS	pw:\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5B_FinalBrDes\6.0_CAD_BIM\6.2_WIP\Bridge\PPCB Design No. 226 - I-80EB over 29th St.				

Revision 05-11: Added the Bend to the 3rd Deflected Strand at the Top to be Bent Down at the Beam End.
Issued 02-08.
Beams.dgn - 4764 - This Sheet Re-Issued 04-2024. Sheet Format Update.



Top View

The top flange beam corners are to be chamfered 2" as shown at both ends of the beam.



Section A-A (Alternate)

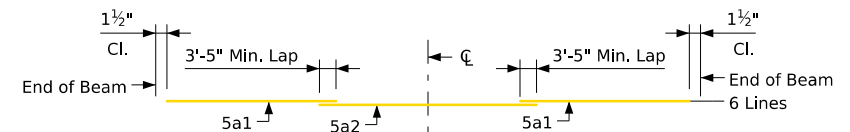
See Alternate Bar Note on Design Sheet No. 21.

Area = 631.7 in.²
 $\bar{y}_b = 17.14$ in.
 $I = 99,980$ in.⁴

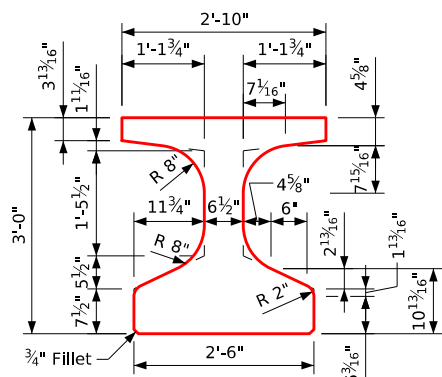
Beam Section Properties

Note: Stirrup Extension.

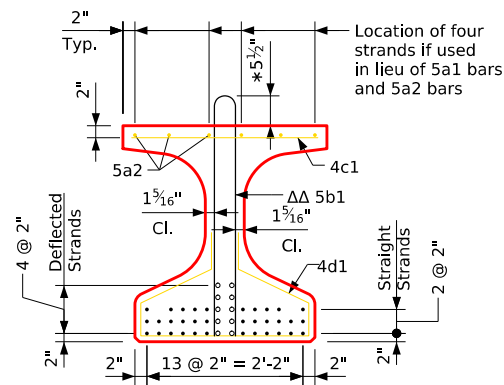
* The standard 5" projection has been increased.



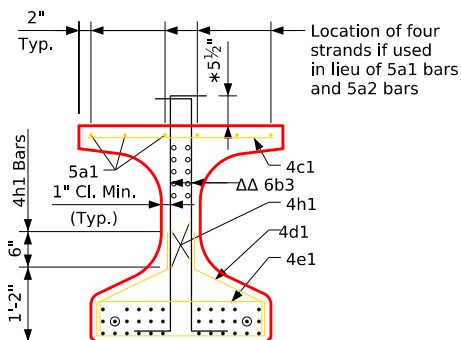
Top Flange Longitudinal Bar Layout



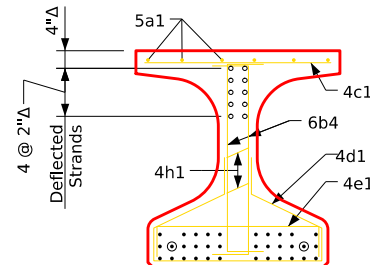
BTB Beam Cross Section



Section A-A



Section B-B



View C-C

- Deflected Strands
- Dimensions at End of Beam
- Epoxy Coated Bars
- Strands Debonded 6'-0" from Beam Ends

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

BTB95 Beam Details

STA. 1131+93.78, 42.00' Rt. (\bar{C} I-80 Existing) Turn-in Date: October, 2025

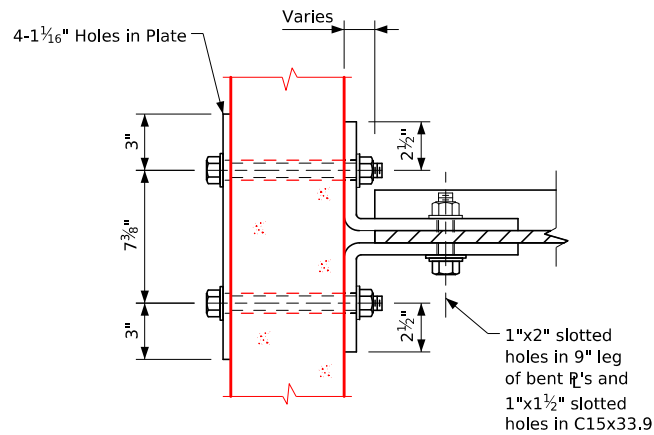
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

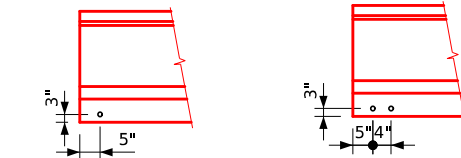
Design No. 226 Design Sheet No. 24 of 41 FHWA No. 041951

<p>Bulb Tee "B" Beam Intermediate Diaphragm Structural Steel</p>
--

One Beam Connection (Detail "F")			Weight
Four - $\frac{7}{8}$ " \varnothing X 9 $\frac{1}{4}$ " H.S. Bolts with Nuts & Washers = 9.6 Lbs.		No. of Beam Connections 48	461
One Detail "F"	One - Backing \overline{P} 5" x $\frac{3}{8}$ " x 1'-1 $\frac{3}{8}$ " = 7.1 Lbs.	48	341
	Two - Bent \overline{P} 9" x 6" x $\frac{1}{2}$ " x 0'-11" = 46.8 Lbs.	48	2,246
One Diaphragm		Number of Diaphragms	
Six - $\frac{7}{8}$ " \varnothing X 3" H.S. Bolts with Nuts & Washers = 7.8 Lbs.			
		24	187
	Length of Member		
One - C15 x 33.9 = 33.9 Lbs./Ft.	7'-7"	24	6,170
Intermediate Diaphragm Structural Steel - Total (Lbs.)			9,405



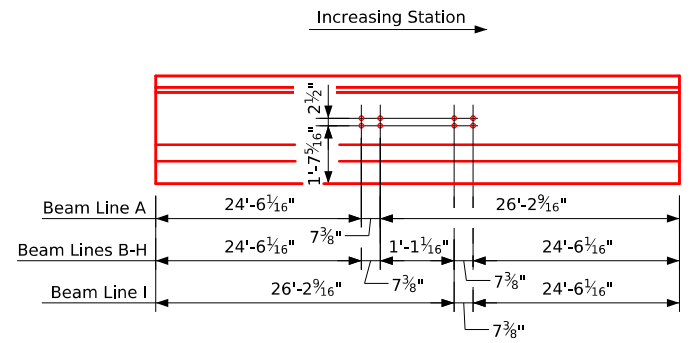
Section C-C



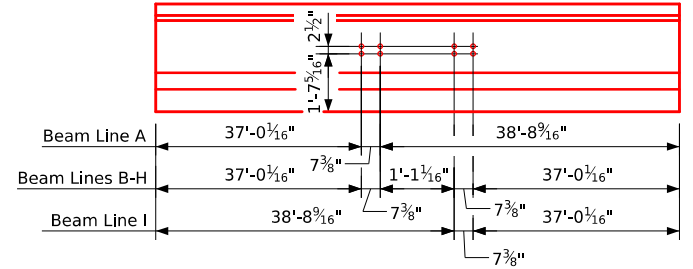
Integral Abutment

Fixed Pier

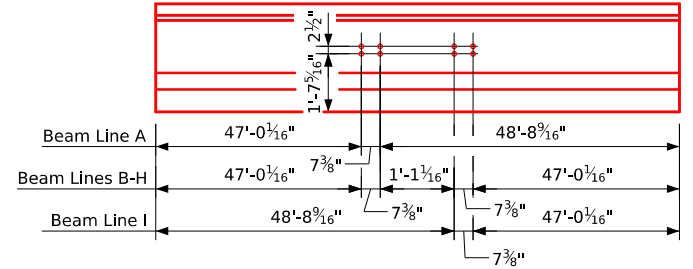
Beam Coil Tie Locations



BTB50



BTB75



BTB95

Intermediate Diaphragm Bolt Hole Locations

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 1½"Ø holes for the 7⁄8"Ø H.S. bolts shall be cast into the web. Drilling is not allowed.

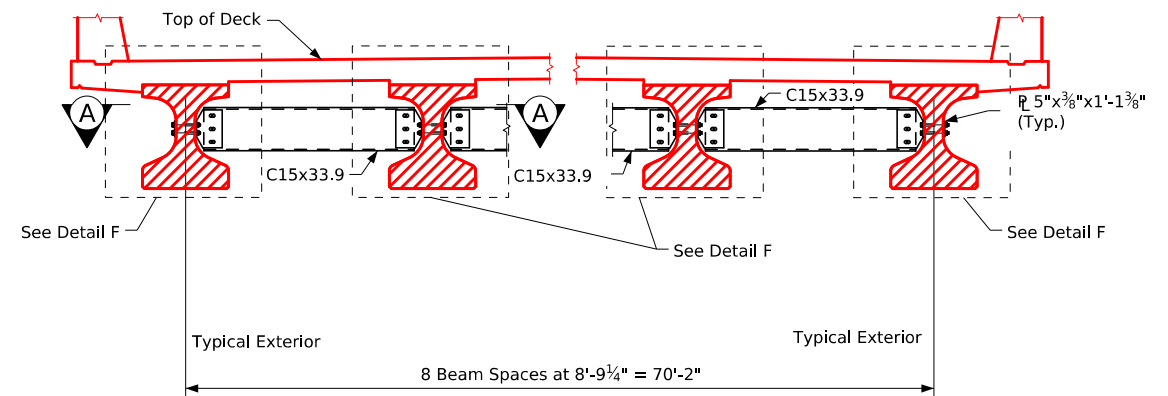
The 7/8"Ø H.S. bolts through the web shall have a thread length of 3" min. and 4" max. and shall meet the requirements of ASTM A449.

All bolts are to be tightened prior to placing bridge deck concrete with the following exception: Bolts in diaphragms located under longitudinal bridge deck construction joints shall not be tightened until stage two of the bridge deck has been placed.

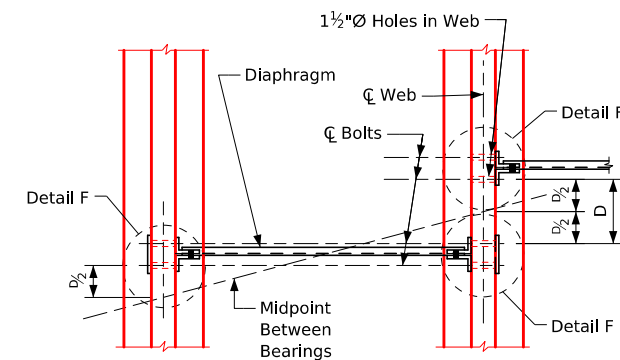
For location of Section C-C, see Design Sheet No. 26.

STRUCTURAL STEEL	
Weight	9,405 lbs.

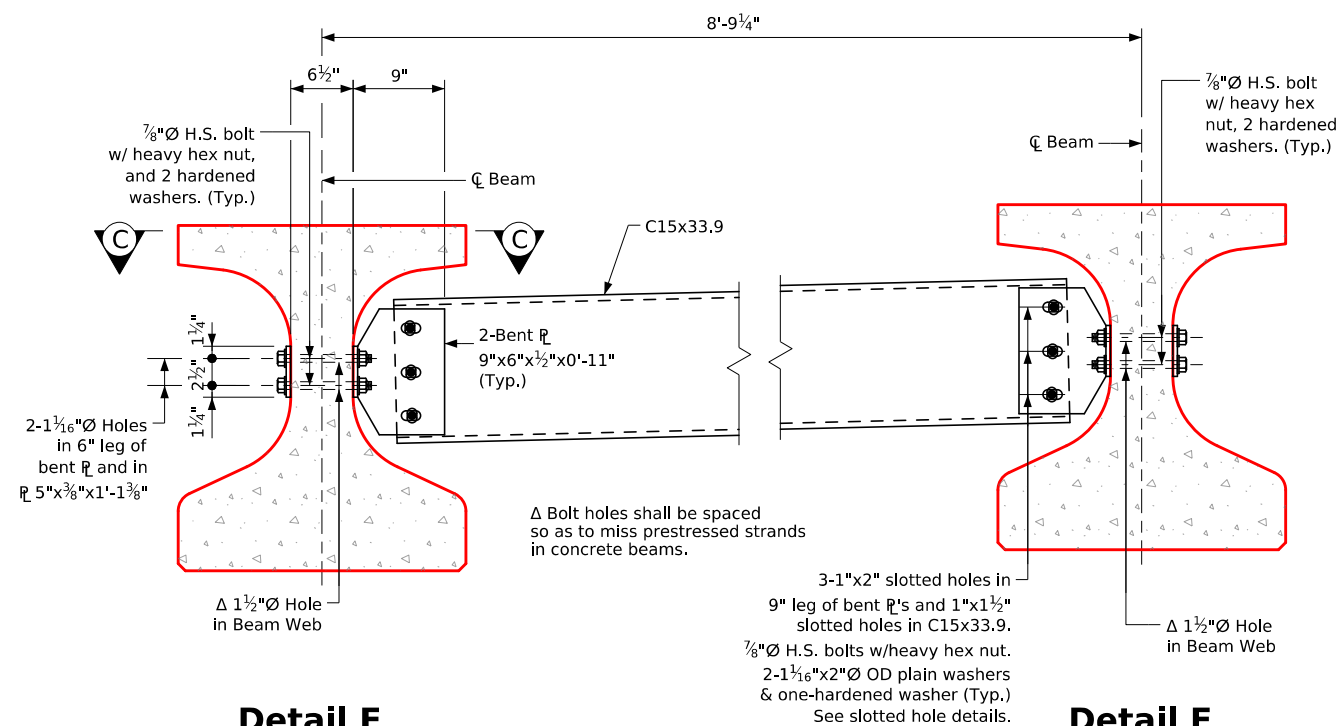
NOTE: Structural Steel weight
is included on the Summary
Quantities Sheet.



Section Showing Intermediate Diaphragms



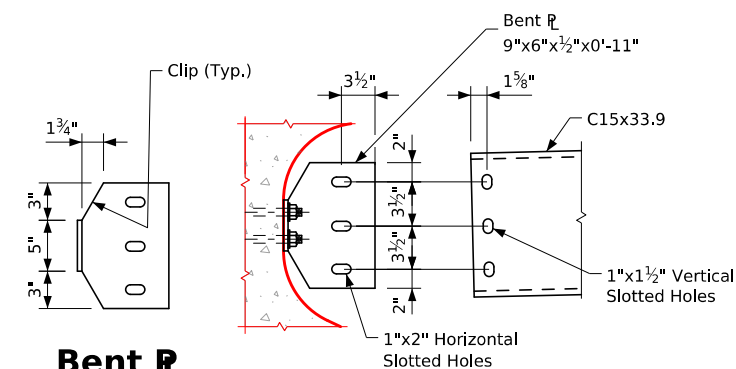
Part Section A-A



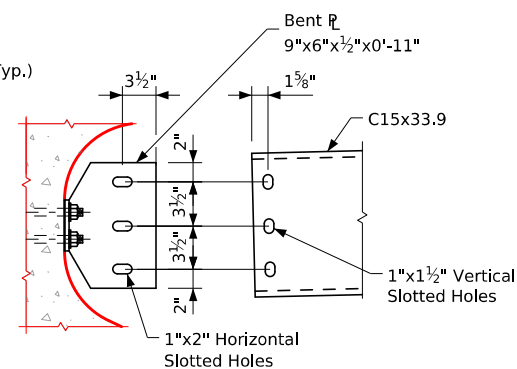
Detail F

Section Showing Intermediate Diaphragms

Detail F



Bent R Detail



Slotted Hole Details

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

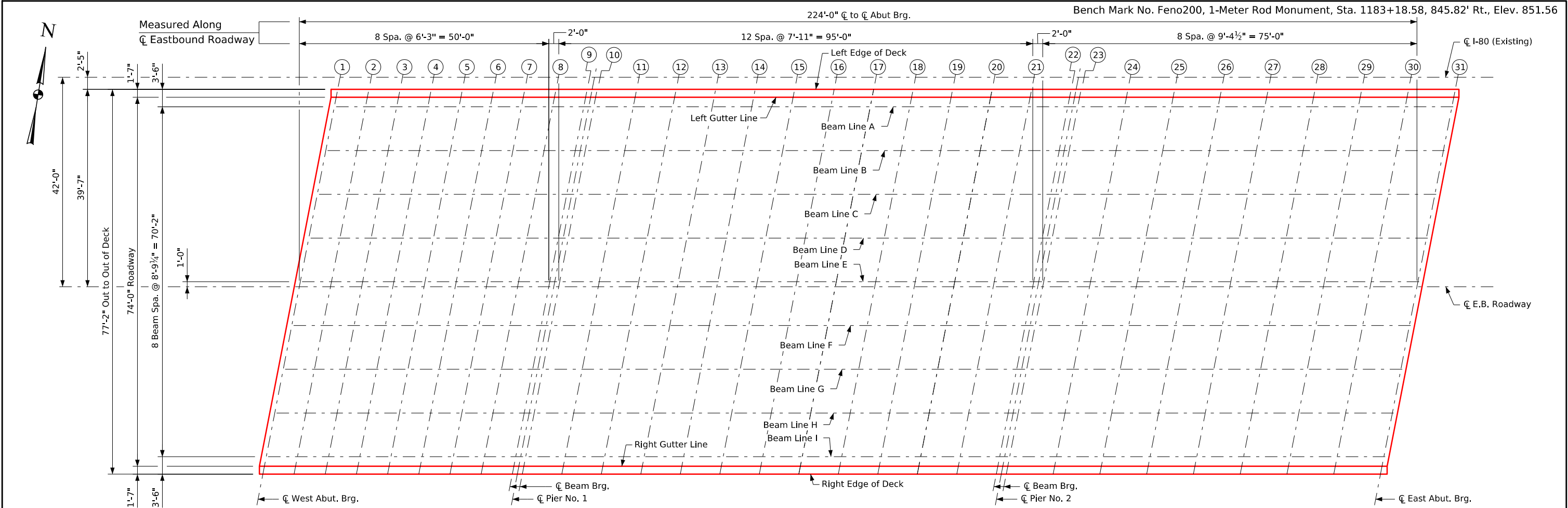
Steel Diaphragm Details

STA. 1131+93.78, 42.00' Rt. (C I-80 Existing) Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 26 of 41 FHWA No. 041951



Top of Deck Elevations & Haunch Locations

Table of Top of Deck Elevations

Line \ Point	☐ West Abut. Brg.								☐ Pier No. 1 Bearings									
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
Left Edge of Deck	937.74	937.63	937.52	937.41	937.30	937.19	937.08	936.96	936.84	936.80	936.65	936.50	936.34	936.18	936.02	935.86	935.69	935.52
Left Gutter Line	937.74	937.64	937.53	937.42	937.31	937.20	937.08	936.96	936.85	936.81	936.66	936.50	936.35	936.19	936.03	935.86	935.70	935.53
Beam Line A	937.80	937.69	937.58	937.47	937.36	937.25	937.14	937.02	936.90	936.86	936.71	936.56	936.40	936.24	936.08	935.92	935.75	935.58
Beam Line B	938.05	937.94	937.83	937.72	937.61	937.50	937.39	937.27	937.15	937.12	936.97	936.81	936.66	936.50	936.34	936.17	936.01	935.84
Beam Line C	938.30	938.19	938.08	937.97	937.86	937.75	937.64	937.52	937.41	937.37	937.22	937.06	936.91	936.75	936.59	936.43	936.26	936.10
Beam Line D	938.53	938.43	938.32	938.21	938.10	937.99	937.88	937.76	937.65	937.61	937.46	937.31	937.15	936.99	936.83	936.67	936.51	936.34
Beam Line E	938.72	938.62	938.51	938.40	938.29	938.18	938.07	937.95	937.84	937.80	937.65	937.50	937.35	937.19	937.03	936.87	936.70	936.54
☐ E.B. Roadway	938.73	938.62	938.52	938.41	938.30	938.19	938.07	937.96	937.84	937.81	937.66	937.51	937.35	937.20	937.04	936.88	936.71	936.54
Beam Line F	938.63	938.52	938.42	938.31	938.20	938.09	937.98	937.86	937.75	937.71	937.56	937.41	937.26	937.10	936.94	936.78	936.62	936.45
Beam Line G	938.46	938.35	938.25	938.14	938.03	937.92	937.81	937.70	937.58	937.55	937.40	937.25	937.09	936.94	936.78	936.62	936.46	936.29
Beam Line H	938.27	938.16	938.06	937.95	937.84	937.73	937.62	937.51	937.39	937.36	937.21	937.06	936.91	936.75	936.59	936.43	936.27	936.11
Beam Line I	938.08	937.97	937.87	937.76	937.65	937.54	937.43	937.32	937.21	937.17	937.02	936.87	936.72	936.57	936.41	936.25	936.09	935.92
Right Gutter Line	938.04	937.93	937.83	937.72	937.61	937.50	937.39	937.28	937.17	937.13	936.98	936.83	936.68	936.53	936.37	936.21	936.05	935.88
Right Edge of Deck	938.04	937.94	937.83	937.73	937.62	937.51	937.40	937.29	937.17	937.13	936.99	936.84	936.69	936.53	936.37	936.22	936.05	935.89
		☐ Pier No. 2 Bearings															☐ East Abut. Brg.	
Line \ Point	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛					
Left Edge of Deck	935.35	935.18	935.00	934.82	934.78	934.56	934.34	934.12	933.90	933.67	933.44	933.20	932.96					
Left Gutter Line	935.36	935.18	935.01	934.83	934.78	934.57	934.35	934.13	933.90	933.68	933.44	933.21	932.97					
Beam Line A	935.41	935.24	935.06	934.89	934.84	934.63	934.41	934.19	933.96	933.73	933.50	933.27	933.03					
Beam Line B	935.67	935.50	935.32	935.14	935.10	934.88	934.67	934.45	934.22	933.99	933.76	933.53	933.29					
Beam Line C	935.93	935.75	935.58	935.40	935.36	935.14	934.93	934.71	934.48	934.25	934.02	933.79	933.55					
Beam Line D	936.17	936.00	935.83	935.65	935.60	935.39	935.17	934.95	934.73	934.50	934.27	934.04	933.80					
Beam Line E	936.37	936.20	936.02	935.85	935.80	935.59	935.37	935.16	934.93	934.71	934.48	934.24	934.01					
☐ E.B. Roadway	936.38	936.20	936.03	935.86	935.81	935.60	935.38	935.16	934.94	934.71	934.49	934.25	934.02					
Beam Line F	936.28	936.11	935.94	935.76	935.72	935.51	935.29	935.07	934.85	934.63	934.40	934.17	933.93					
Beam Line G	936.12	935.95	935.78	935.60	935.56	935.35	935.13	934.92	934.69	934.47	934.24	934.01	933.78					
Beam Line H	935.94	935.77	935.60	935.42	935.38	935.17	934.95	934.74	934.52	934.29	934.06	933.83	933.60					
Beam Line I	935.76	935.59	935.42	935.24	935.20	934.99	934.77	934.56	934.34	934.11	933.89	933.66	933.42					
Right Gutter Line	935.72	935.55	935.38	935.20	935.16	934.95	934.73	934.52	934.30	934.07	933.85	933.62	933.38					
Right Edge of Deck	935.72	935.55	935.38	935.21	935.16	934.96	934.74	934.53	934.31	934.08	933.86	933.63	933.39					

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Top of Deck Elevations

STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

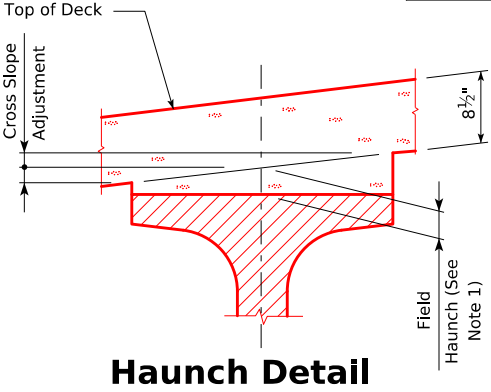
Design No. 226Design Sheet No. 27 of 41FHWA No. 041951

REVISED 06-12 - THE ALLOWABLE FIELD HAUNCH MAX. & MIN. WAS CHANGED TO INCHES & DECIMALS OF FEET. NOTE & NOTE 1 WERE CHANGED. THE SLAB HAUNCH LOCATIONS EXAMPLE WAS REPLACED WITH A NOTE.
REVISED 07-2019; CHANGED ALL REFERENCES OF "SLAB" TO "DECK".
ENGLISHMISCELLANEOUSBRIDGES.DGN - 1066 - THIS SHEET ISSUED 02-08.

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

Table of Beam Line Haunch Elevations																		
	☐ West Abut. Brg.								☐ Pier No. 1 Bearings									
Beam Line	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
A	937.09	937.00	936.90	936.79	936.69	936.57	936.45	936.32	936.19	936.16	936.09	936.01	935.92	935.81	935.67	935.52	935.35	935.15
B	937.34	937.24	937.15	937.04	936.94	936.82	936.70	936.57	936.45	936.41	936.34	936.26	936.17	936.06	935.93	935.78	935.60	935.40
C	937.59	937.49	937.39	937.29	937.19	937.07	936.95	936.83	936.70	936.66	936.59	936.51	936.42	936.31	936.18	936.03	935.85	935.66
D	937.82	937.73	937.63	937.53	937.42	937.31	937.19	937.07	936.94	936.90	936.83	936.75	936.66	936.55	936.42	936.27	936.10	935.90
E	938.01	937.92	937.82	937.72	937.62	937.50	937.38	937.26	937.13	937.09	937.02	936.95	936.86	936.75	936.62	936.47	936.30	936.10
F	937.92	937.83	937.73	937.63	937.52	937.41	937.29	937.17	937.04	937.00	936.94	936.86	936.77	936.66	936.54	936.38	936.21	936.02
G	937.75	937.66	937.56	937.46	937.36	937.24	937.12	937.00	936.87	936.84	936.77	936.70	936.61	936.50	936.37	936.22	936.05	935.85
H	937.56	937.47	937.37	937.27	937.17	937.05	936.94	936.81	936.69	936.65	936.58	936.51	936.42	936.31	936.19	936.04	935.87	935.67
I	937.37	937.28	937.18	937.08	936.98	936.87	936.75	936.62	936.50	936.46	936.40	936.32	936.24	936.13	935.00	935.85	935.68	935.49
				☐ Pier No. 2 Bearings									☐ East Abut. Brg.					
Beam Line	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛					
A	934.93	934.69	934.44	934.18	934.13	933.97	933.80	933.61	933.40	933.16	932.90	932.62	932.32					
B	935.18	934.95	934.70	934.44	934.39	934.23	934.06	933.87	933.66	933.42	933.16	932.88	932.58					
C	935.44	935.20	934.95	934.69	934.65	934.49	934.32	934.13	933.92	933.68	933.42	933.14	932.84					
D	935.68	935.45	935.20	934.94	934.90	934.74	934.57	934.38	934.17	933.93	933.67	933.39	933.10					
E	935.88	935.65	935.40	935.14	935.09	934.94	934.77	934.58	934.37	934.13	933.87	933.59	933.30					
F	935.80	935.56	935.32	935.06	935.01	934.86	934.69	934.50	934.29	934.05	933.80	933.52	933.22					
G	935.64	935.40	935.16	934.90	934.85	934.70	934.53	934.34	934.13	933.90	933.64	933.36	933.07					
H	935.45	935.22	934.97	934.72	934.67	934.52	934.35	934.17	933.96	933.72	933.46	933.18	932.89					
I	935.27	935.04	934.79	934.53	934.49	934.34	934.17	933.99	933.78	933.54	933.29	933.01	932.71					

Miscellaneous Data Table																					
	Beam Line		☐ West Abut. Brg.								☐ Pier No. 1 Bearings										
			①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	
Anticipated Deflection Due to Deck (in.)	All		0	1/8	1/4	3/8	3/8	3/8	1/4	1/8	0	0	1	1 7/8	2 5/8	3 1/4	3 9/16	3 11/16	3 9/16	3 1/4	
Cross Slope Adjustments (in.)	A-C, G-I		7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	
	D-F		5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	
Allowable Field Haunch (in. & ft.)	Max.	All	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	
		A-C, G-I	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	
	Min.	D-F	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	
	Beam Line							☐ Pier No. 2 Bearings							☐ East Abut. Brg.						
			⑰	⑱	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛						
Anticipated Deflection Due to Deck (in.)	All		2 5/8	1 7/8	1	0	0	11/16	1 1/4	1 5/8	1 3/4	1 5/8	1 1/4	11/16	0						
Cross Slope Adjustments (in.)	A-C, G-I		7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16						
	D-F		5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16						
Allowable Field Haunch (in. & ft.)	Max.	All	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)	3 (0.250)						
		A-C, G-I	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)						
	Min.	D-F	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)						



Note:
Haunch locations are at the same location as the encircled numbers shown on the Top of 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 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

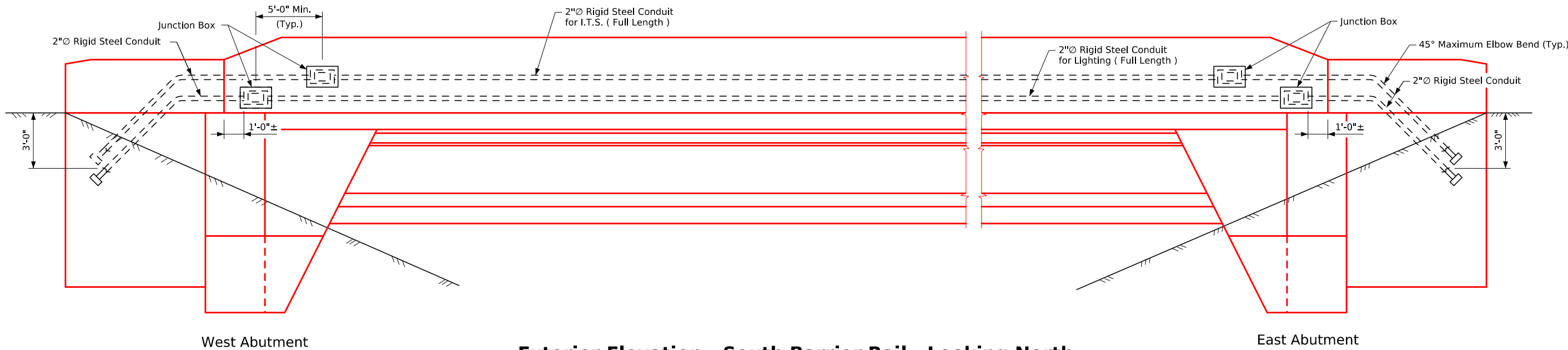
Field Haunch Details

STA. 1131+93.78, 42.00' Rt. (☐ I-80 Existing)Turn-in Date: October, 2025

Polk County

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Lighting 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 $\frac{1}{4}$ ". 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.

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.

I.T.S. Conduit Notes:

See LI-104 standard road plan for additional informational information on junction boxes.

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.

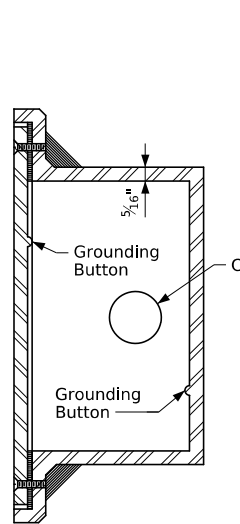
All burrs and roughened surfaces shall be removed from conduits and fittings. All conduit runs shall be reamed, cleaned and swabbed for installation of fiber optic cable.

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.

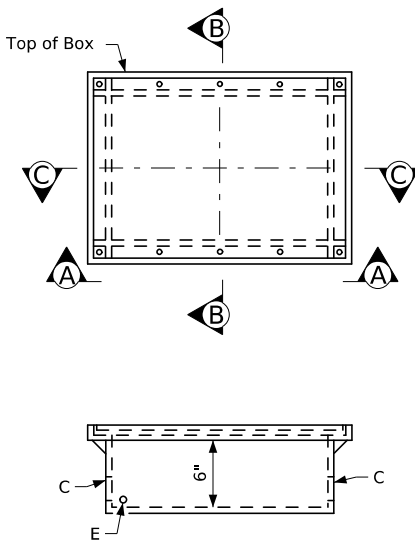
I.T.S. conduit shall include a polypropylene pull rope between handholes with a minimum 600 pound tensile strength.

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.

Exterior Elevation - South Barrier Rail - Looking North



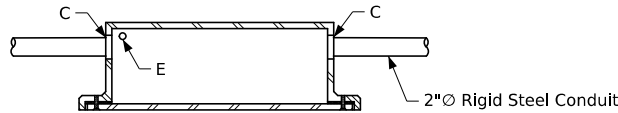
Section B-B



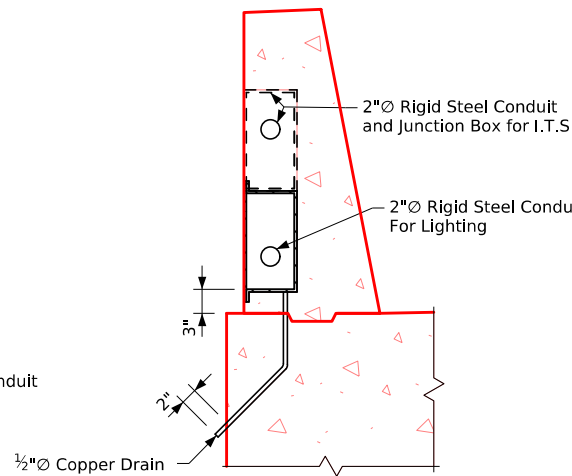
View A-A

Bossed For	Hole	For Conduit Size
5 Threads	C	2"Ø Rigid Steel
None	E	$\frac{1}{2}$ "Ø Copper Pipe

Note:
The grounding buttons are to be blind drilled and tapped for $\frac{3}{8}$ "Ø x 0'-0 $\frac{1}{4}$ " bolts.



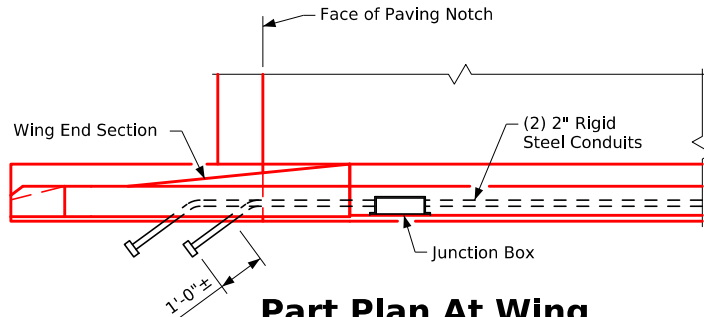
Section C-C



Section Thru Junction Box

LI-104 Junction Box

Watertight, Cast Iron - Flush Mount



Part Plan At Wing

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Conduit Details

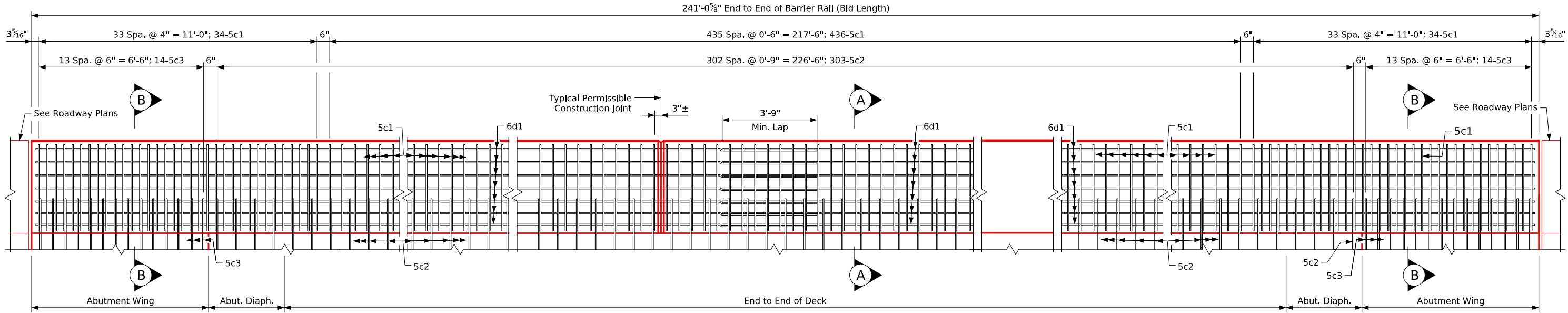
STA. 1131+93.78, 42.00' Rt. (C I-80 Existing) Turn-in Date: October, 2025

Polk County

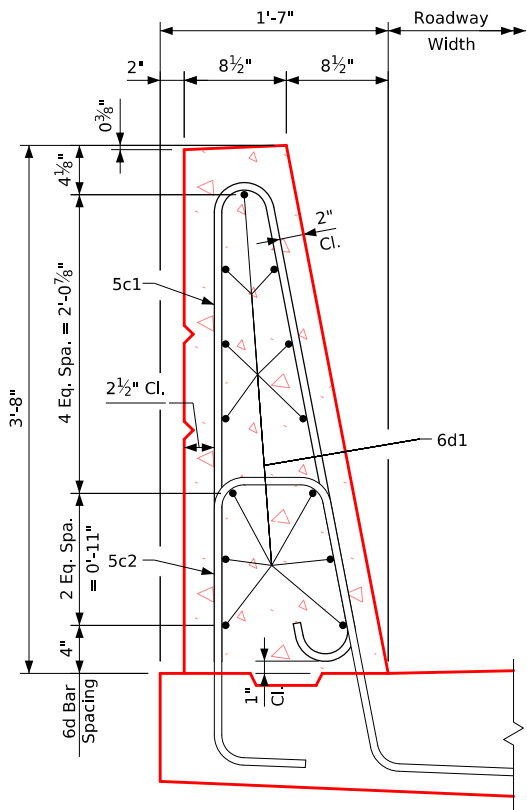
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 29 of 41 FHWA No. 041951

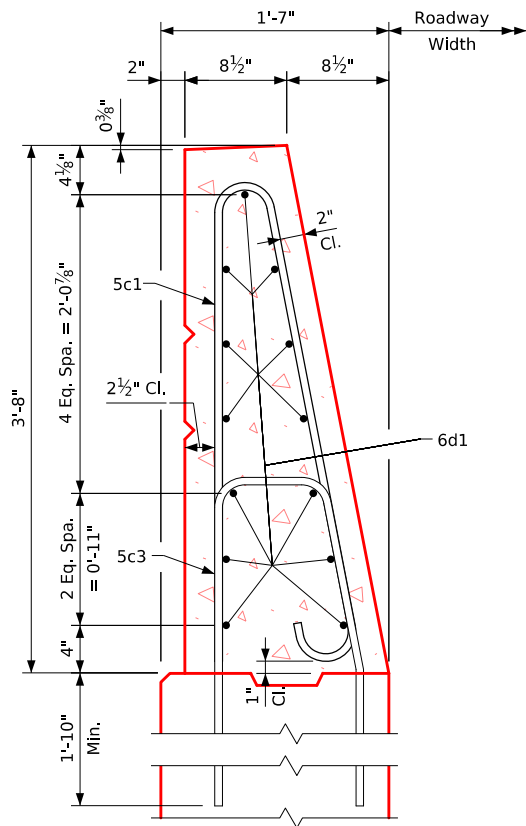
Correction 04-14: Added Stainless Steel Reinforcing Bar List and Changed 5c2 Bars to Stainless Steel.
Issued 11-07.
DeckRailBridges.dgn - 1020SD-1 -This Sheet Re-Issued 05-2024. Revised to Single Slope Barrier Shape. Sheet Format Update. (Sheet Number was Originally 1020SD).



Elevation of North Barrier Rail



Part Section A-A



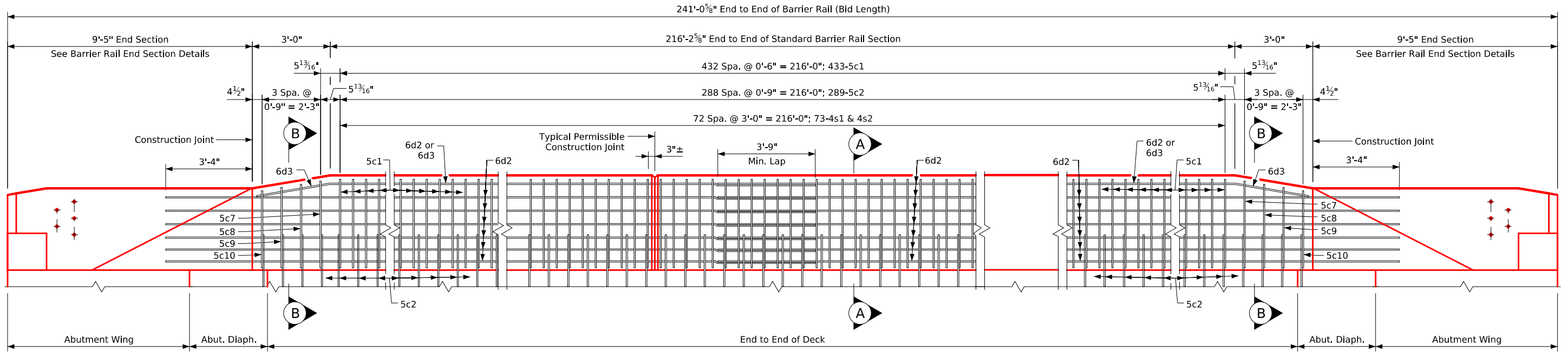
Part Section B-B

Note:
See Barrier Rail Rustication Details
on Design Sheet No. 35.

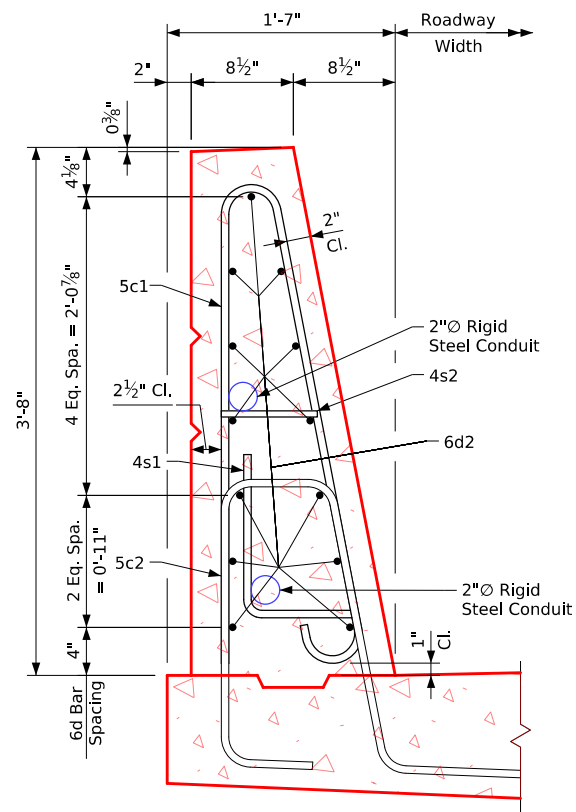
Notes:
See Barrier Rail Details on Design Sheet No. 32
for notes, reinforcing steel details, and quantities.

Design For 11°00'00" Skew (LA)
**224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge**
51'-0" & 76'-0" End Spans 97'-0" Interior Span
North Barrier Rail Details
STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025
Polk County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 30 of 41 FHWA No. 041951

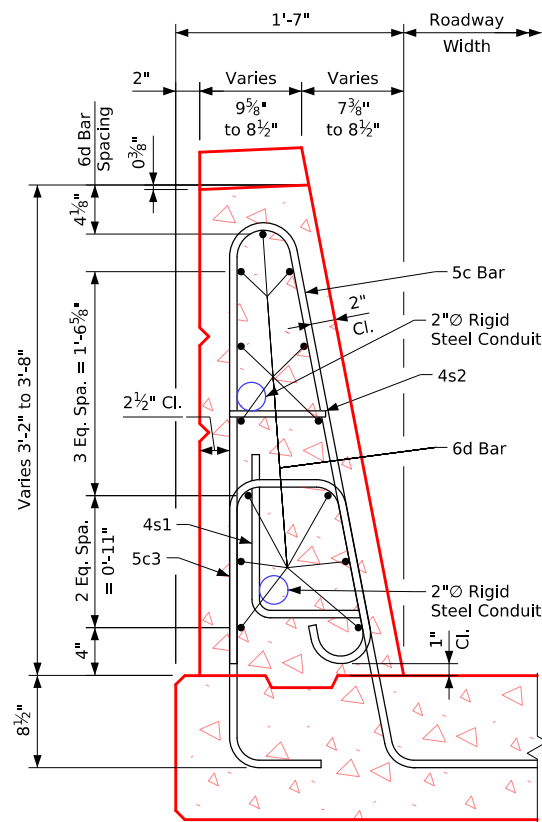
Correction 04-14: Added Stainless Steel Reinforcing Bar List and Changed 5c2 Bars to Stainless Steel.
Issued 11-07.
DeckRailBridges.dgn - 1020SD-1 -This Sheet Re-Issued 05-2024. Revised to Single Slope Barrier Shape. Sheet Format Update. (Sheet Number was Originally 1020SD).



Elevation of South Barrier Rail



Part Section A-A



Part Section B-B

Note:
See Barrier Rail Rustication Details on Design Sheet No. 35.

Notes:
See Barrier Rail Details on Design Sheet No. 32 for notes, reinforcing steel details, and quantities.
Galvanized conduit shall not come into contact with the stainless steel reinforcing.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

South Barrier Rail Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 31 of 41 FHWA No. 041951

Deckrailbridges.dgn - 10205D-2 -This Sheet Issued 05-2024. Additional Sheet For Clarity. (Sheet Number Was Originally 10205D).

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 Construction and Materials I.M. 452.

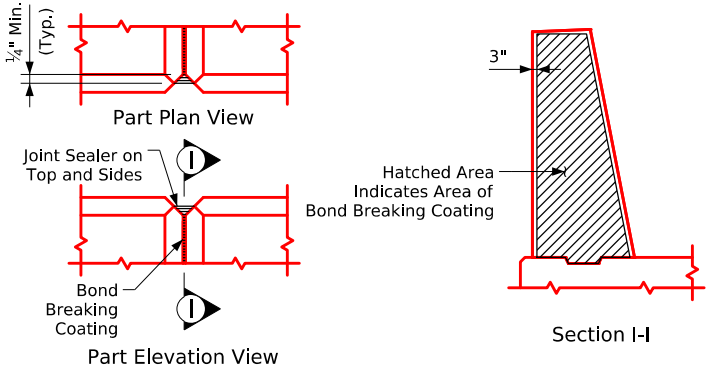
The concrete barrier rail is to be bid on a lineal foot basis. The number of linear feet of barrier rail installed will be paid for at the contract price per lineal foot based on plan quantities. Price bid for concrete barrier railing shall be full compensation for furnishing all material, excluding reinforcing steel, and all of the equipment and labor required to erect the rail in accordance with these plans and current specifications. 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.

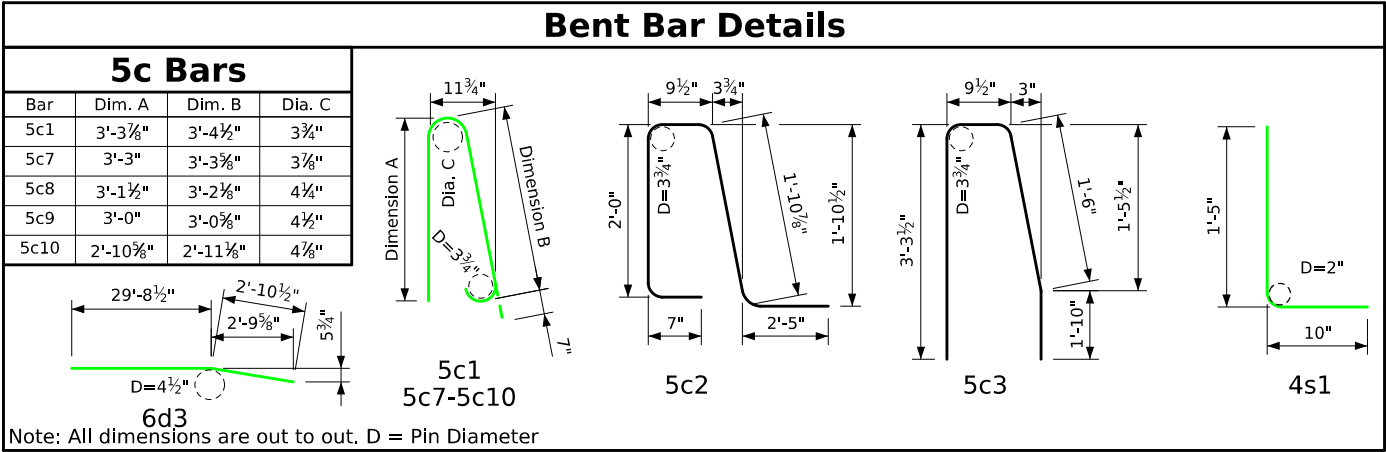
Top of the barrier rail is to be parallel to the theoretical ∇ grade.

All exposed corners on the top of the barrier and all other corners 90° or sharper to be filleted with a $\frac{3}{4}$ " dressed and beveled strip.

Cross sectional area of the Standard Sections of the barrier rail = 3.90 square feet, except the 3'-0" sloped ends at the end sections.



Barrier Rail Joint Details



Note: Reinforcing steel quantities are included on the Summary Quantities Sheet.

Epoxy Coated Reinf. Steel - Two Rails

Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c1	Rail, Vertical		937	7'-6"	7,330
	5c7	Rail, Vertical, Sloped Ends		2	7'-4"	15
	5c8	Rail, Vertical, Sloped Ends		2	7'-1"	15
	5c9	Rail, Vertical, Sloped Ends		2	6'-10"	14
	5c10	Rail, Vertical, Sloped Ends		2	6'-7"	14
	6d1	Rail, Longitudinal		91	37'-8"	5,148
	6d2	Rail, Longitudinal		89	36'-0"	4,812
	6d3	Rail, Longitudinal, Top		2	32'-7"	98
	4s1	Rail, Conduit		73	2'-3"	110
	4s2	Rail, Conduit		73	0'-8"	33

Epoxy Reinf. Total Weight (lbs.) 17,589

Stainless Steel Reinf. Steel - Two Rails

Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c2	Rail, Vertical		600	7'-9"	4,850
	5c3	Rail, Vertical		28	7'-5"	217

Stainless Steel Reinf. Total Weight (lbs.) 5,067

Concrete Placement Summary

Section	Total
North Rail Standard Section 241'-0 $\frac{5}{8}$ " at 0.144 cu. yd. per ft.	34.7
Δ South Rail Standard Section 241'-0 $\frac{5}{8}$ " at 0.144 cu. yd. per ft.	34.7
Total (cu. yd.)	69.4

Note: Δ Deduct 0.021 cu. yd. for one sloped end.

Concrete Barrier Rail Quantities

Item	Unit	Quantity
Concrete Barrier Railing, 3'-8"	L.F.	482.1

Note:
See Barrier Rail Details on Design Sheet No. 30
and 31 for details and sections.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Barrier Rail Details

STA. 1131+93.78, 42.00' Rt. (℄ I-80 Existing)Turn-in Date: October, 2025

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Design No. 226Design Sheet No. 32 of 41FHWA No. 041951

[illegible]

Technical drawing of a wing wall cross-section. The drawing includes the following dimensions and labels:

- Overall Dimensions:**
 - Top width: 9'-5" End Section
 - Bottom width: 1'-6" + 1'-9" + 6'-2" = 9'-6"
 - Height: 3'-2"
- Vertical Dimensions (Left Side):**
 - Top to top of wing: 2'-10⁷/₈"
 - Top to top of wing (split): 1'-6¹/₂" + 1'-5"
 - Top to top of wing (split): 2'-0"
- Horizontal Dimensions (Top):**
 - Left to center of hole: 1'-10³/₄"
 - Center of hole to right edge: 8"
 - Left to center of hole: 4"
 - Center of hole to right edge: 1'-2"
- Structural Details:**
 - Three 1" diameter holes (Ø 1" Holes) are shown.
 - Vertical reinforcement bars are shown with dimensions: 3'-13³/₁₆" and 7'-5⁵/₈".
 - Horizontal reinforcement bars are shown with dimensions: 3'-13³/₁₆" and 7'-5⁵/₈".
- Labels:**
 - Vertical
 - Slope Face of Wall
 - Top of Wing
 - Wing
 - Abutment

Provide 5 holes formed with 1"Ø plastic conduit.
Cost to be included in price of bid for Concrete Barrier Railing.

9'-5" End Section

12 - 6c1 & 6c2

3 1/2"

2 @ 4 1/2" = 9"

5"

3 Spa. @ 6" = 1'-6"

8 Spa. @ 9" = 6'-0"

2" Cl.

2" Cl.

5d4

5d2, 5d3, 5d5

5d1, 5d5

4 - 5c6 (Both Faces)

1" Ø Holes

2 @ 9" = 1'-6"

3 - 5c3

5 Spa. @ 9" = 3'-9"

6 - 5c4

3 13/16"

Section A-A, B-B, C-C, D-D, F-F

[illegible]

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Barrier Rail End Section Details

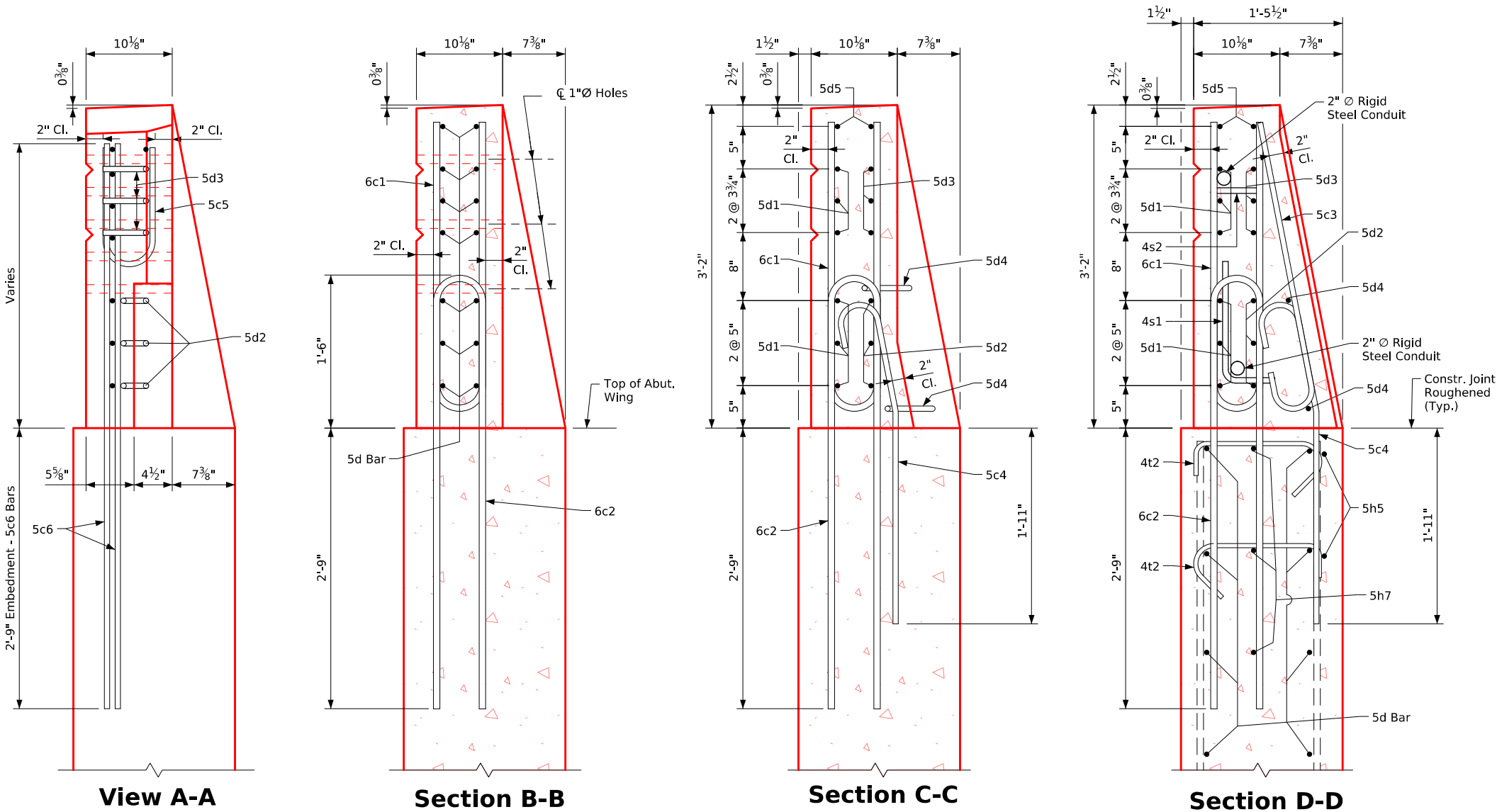
STA. 1131+93.78, 42.00' Rt. (C/L-80 Existing) Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 33 of 41 FHWA No. 041951

DeckRailBridges.dgn - 10175-2 - This Sheet Issued 05-2024. Revised to Single Slope Barrier Shape. Additional Sheet for Clarity. (Sheet Number was Originally 10175).



Abutment wing bars in View A-A and Sections B-B & C-C are not shown for clarity.

Notes: 4t2 placement - 3 bars each at top two rows of 5h1/d bars in abutment wing and abutment wing extension.
Construction joint between top of abutment wing and abutment wing extension with barrier rail is roughened concrete.
The 6c2, 5c4, 5c6, and 4t2 bars are to be placed with the abutment wing and abutment wing extension. The details for placement are shown on the Abutment Wing Sheet and Abutment Wing Extension Sheet.
Dashed lines below the top of wing are the abutment wing reinforcing steel.
See Abutment Wing Sheet and Abutment Wing Extension Sheet for placement.
For Plan and Elevation see Design Sheet No. 33.
Galvanized conduit shall not come into contact with the stainless steel reinforcing.

Note:
See Barrier Rail Rustication Details
on Design Sheet No. 35.

Epoxy Coated Reinforcing Steel - One End Section

Bar	Location	Shape	No.	Length	Weight
6c1	Rail, Vertical		12	5'-11"	107
5c3	Rail, Vertical (Traffic Face)		3	3'-5"	11
5c5	Rail, Vertical (End)		4	Varies	14
5d1	Rail, Horizontal (Back Face)		6	9'-1"	57
5d2	Rail, Horizontal (Traffic Face)		3	9'-1"	28
5d3	Rail, Horizontal (Traffic Face)		3	9'-7"	30
5d4	Rail, Horizontal (Traffic Face)		2	6'-3"	13
5d5	Rail, Horizontal (Top)		2	9'-1"	19
4s1	Rail, Conduit		2	2'-3"	3
4s2	Rail, Conduit		2	0'-8"	1
4t2	Rail, Abutment Wing Tie Bars		6	2'-0"	8

Epoxy Reinforcing Total Weight (lbs.)

291

Stainless Steel Reinforcing Steel - One End Section

Bar	Location	Shape	No.	Length	Weight
6c2	Rail, Vertical		12	8'-9"	158
5c4	Rail, Vertical (Traffic Face)		6	3'-10"	24
5c6	Rail, Vertical (End)		8	Varies	47

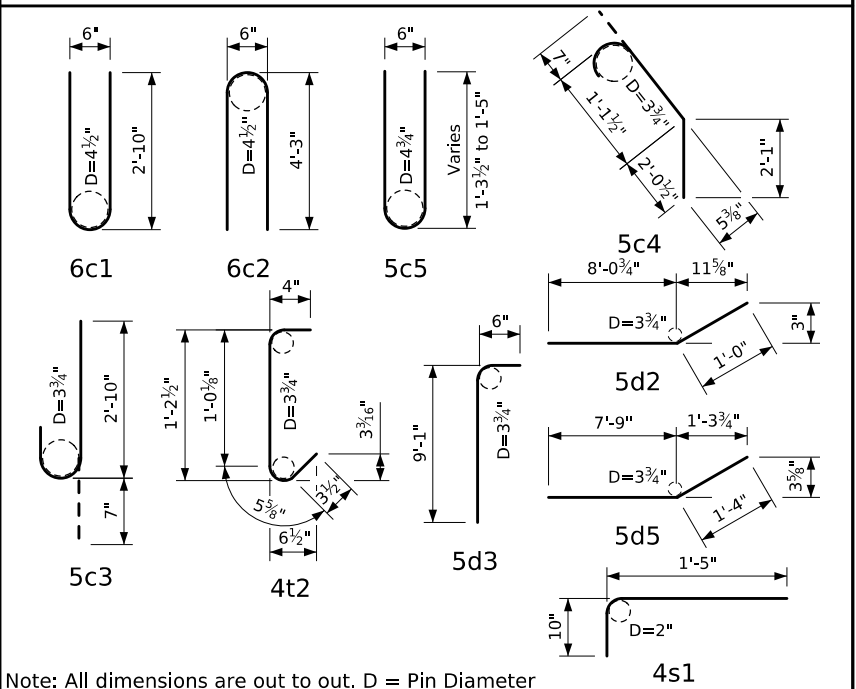
Stainless Steel Reinforcing Total Weight (lbs.)

229

Concrete Placement Summary

Section	Total
Barrier Rail, One End Section	1.0 cu. yd.

Bent Bar Details



Note: All dimensions are out to out. D = Pin Diameter

Note: Reinforcing steel quantities are included on the Summary Quantities Sheet.

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

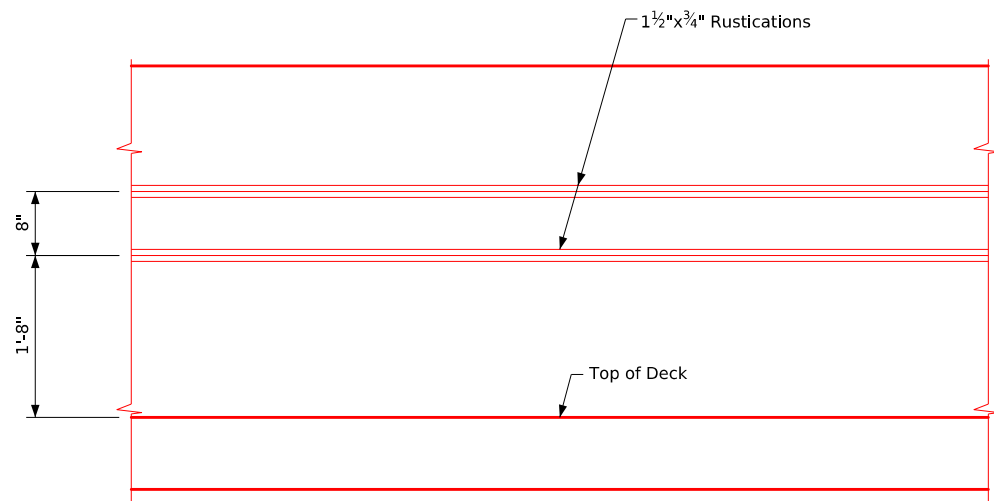
Barrier Rail End Section Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025

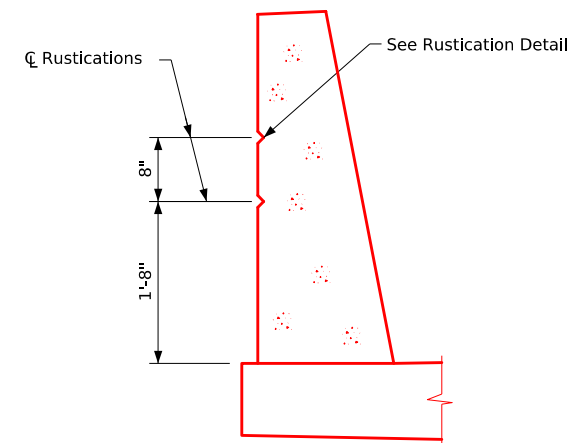
Polk County

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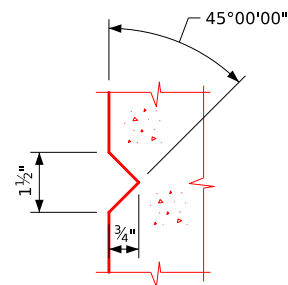
Design No. 226 Design Sheet No. 34 of 41 FHWA No. 041951



**Part Outside Elevation of Standard
Barrier Rail**



**Part Section Through Standard
Barrier Rail**



Rustication Detail

Note:
For Concrete Rustication notes, see Design Sheet No. 4.
Rustications extend the full length of bridge barrier,
including barrier end section.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Barrier Rail Rustication Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

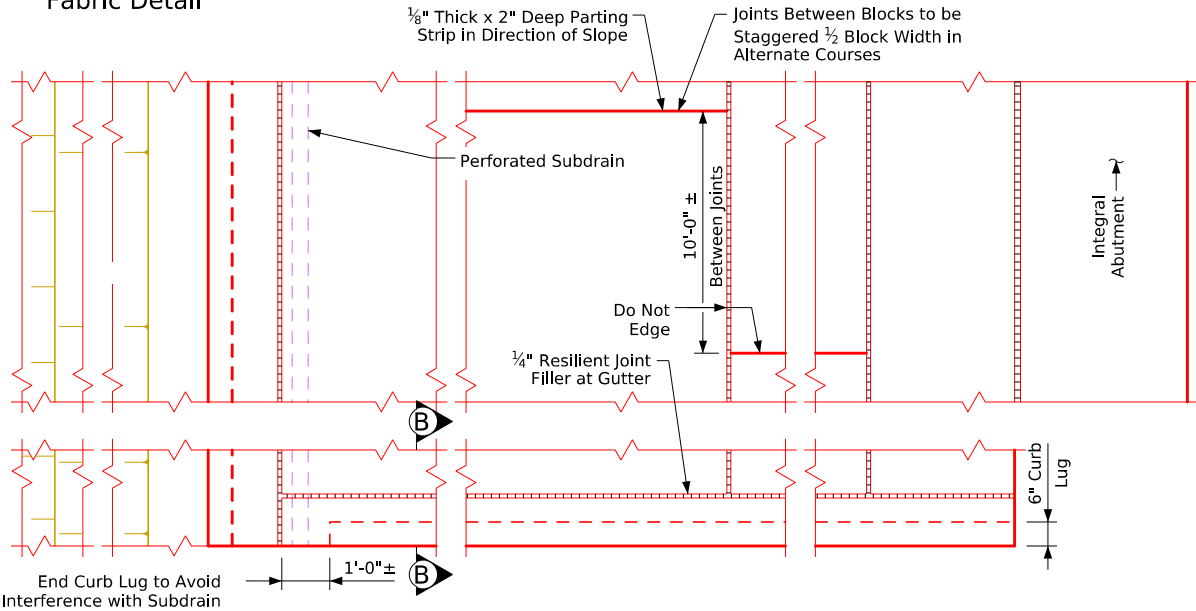
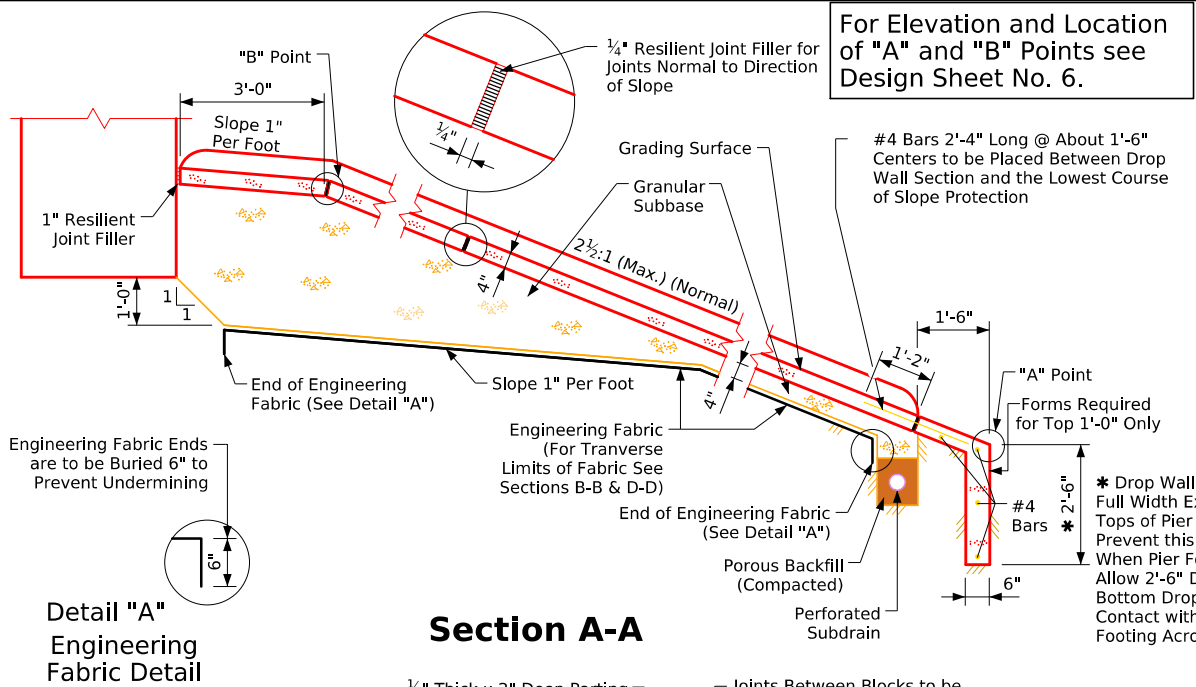
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

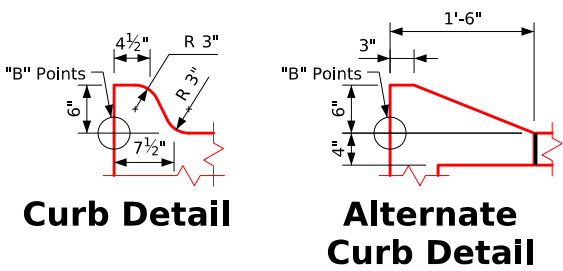
Design No. 226Design Sheet No. 35 of 41FHWA No. 041951



Revised 10-12 - Located the "A" and "B" Points in Section A-A and Curb & Alternate Curb Details.
Revised 09-2023: Added pattern shapes in details to show backfill and subbase materials.
ForeSlopeProtectionBridges.dgn - 1006A - This Sheet Redrawn 8-27-91.
ForeSlopeProtectionBridges.dgn - 1006A - This Sheet Redrawn 07-23.

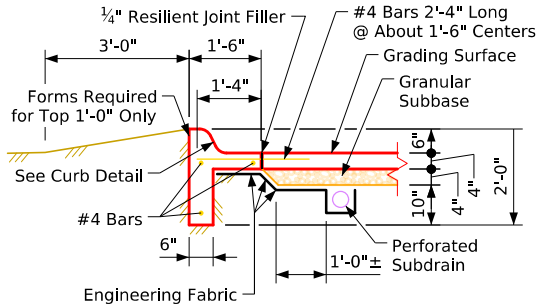


Part Slope Protection Plan



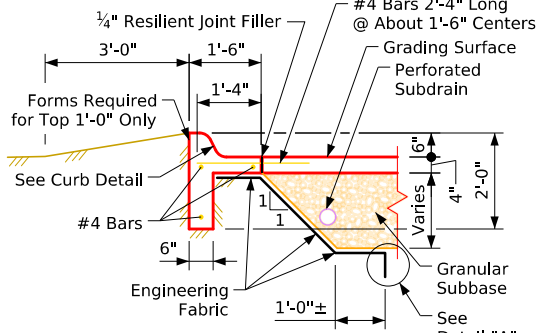
Curb Detail

Alternate Curb Detail



Section B-B

(Through 4" Thick Granular Subbase)



Section C-C

(Through Variable Thickness Granular Subbase)

General Notes:

This plan sheet shows details for placing a portland cement concrete slope protection under overhead structures. The current Specifications of the Iowa Department of Transportation shall apply with modifications or additions listed below:

- Finish - Class 1, floated surface finish.
- Cure - Cure as per current Specifications.
- Granular Subbase - This prewetted material shall be deposited by a method approved by the Engineer and be thoroughly tamped or vibrated to insure compaction. Finished shape shall be as shown in Section A-A.
- Foreslope Preparation - The bridge berm foreslope shall be compacted and shaped as shown in Section A-A. The berm foreslope shall be firm when the engineering fabric and granular subbase are placed. Engineering fabric shall be in accordance with Article 4196.01, B, 2, of the Standard Specifications.

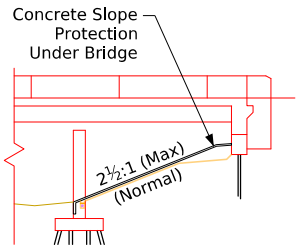
If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

The cast in place concrete is to be poured in approximately 10 ft wide courses, but all courses on one slope should have approximately equal widths. Adjacent courses shall not be poured within 15 hours of one another. The joints in the direction of the slope are to be staggered about 1/2 block width.

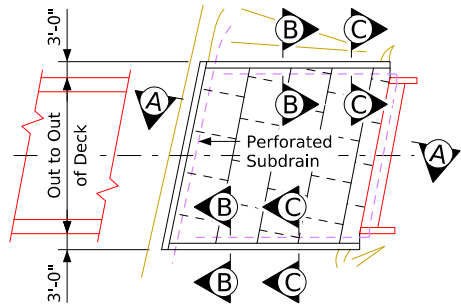
Payment for bid item "Concrete Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard is to include costs of all materials and labor required to construct the slope protection as shown on these plans. The disposal of excess soil from shaping or trenching, as directed by the Engineer, shall be considered incidental to placing the concrete slope protection. Shaping should include excavation from the grading surface shown.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. 39.



Longitudinal Section Along Roadway



East Abutment Slope Protection Layout

Estimated Quantities

Description	Location	Quantity
Concrete Slope Protection	East Abut.	515 Sq. Yds.
	Total	515 Sq. Yds.

Items to be included in "Concrete Slope Protection":
Engineering Fabric
Granular Subbase
Class "C" Structural Concrete
#4 Reinforcing
Resilient Joint Filler
Excavating, Shaping and Compacting

Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

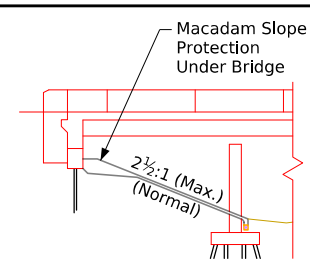
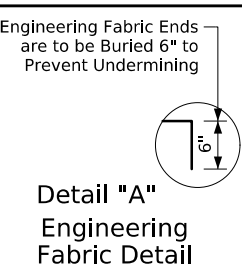
Concrete Slope Protection Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025

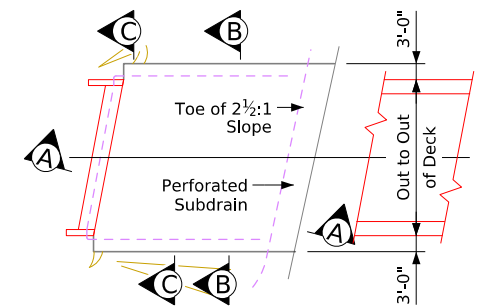
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 36 of 41 FHWA No. 041951

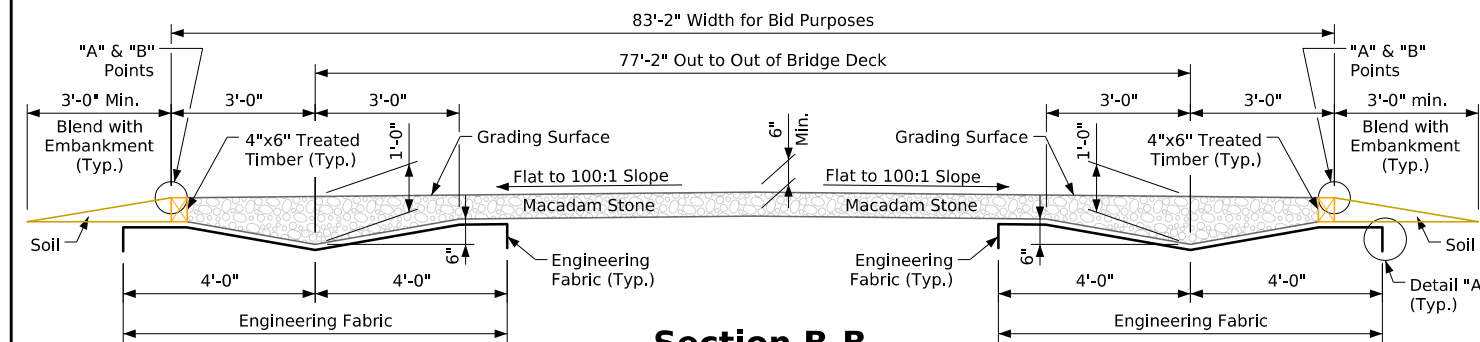


Longitudinal Section Along C Roadway

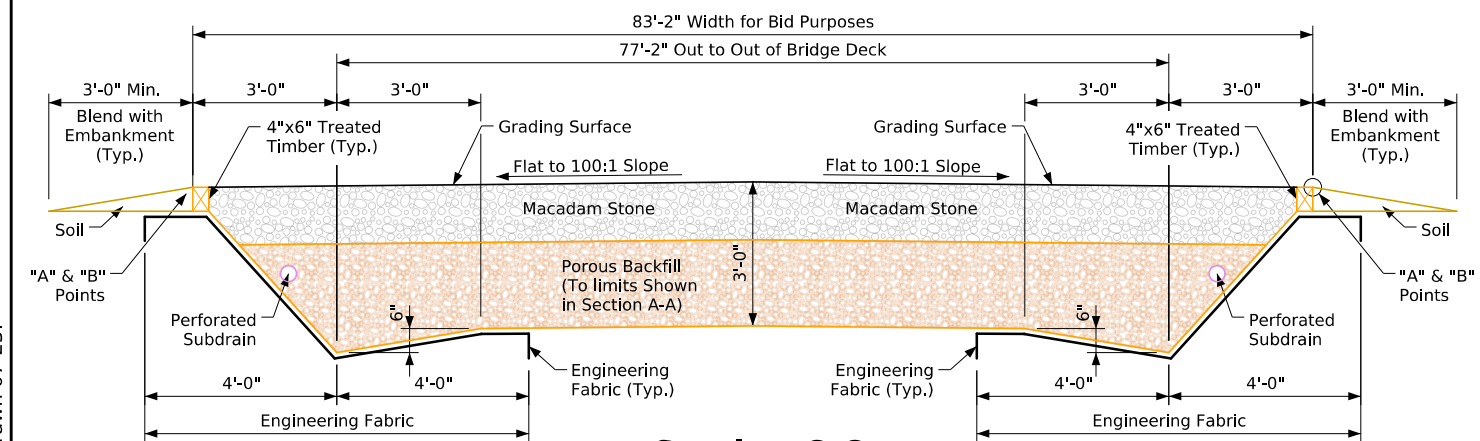


West Abutment Slope Protection Layout

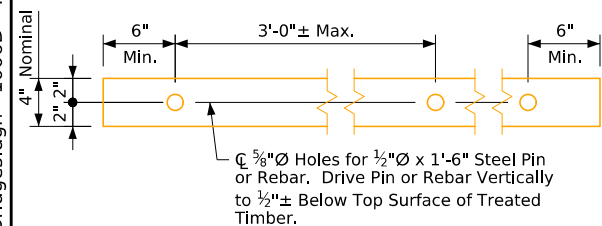
Section A-A



Section B-B



Section C-C



4"x6" Treated Timber Edging Details

For Elevation and Location
of "A" and "B" Points see
Design Sheet No. 6.

Note: The Contractor is to Shape the Macadam Stone, Engineering Fabric and Subdrains Around Pier Columns as Directed by the Engineer.

Engineering Fabric Ends are to be Buried 6" to Prevent Undermining

Detail "A"

Engineering Fabric Detail

This plan sheet shows details for placing a macadam stone slope protection under overhead structures.

The bridge berm foreslope shall be compacted and shaped as shown on this sheet. Shaping will include excavation from the grading surface shown on the situation plan and as directed by the Engineer. The berm foreslope shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications. If the engineering fabric is lapped, the laps shall be a minimum of 1 ft in length, shingle fashion with up slope lap place on top and stapled for continuity.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform depth and density and provide uniform surface appearance.

Payment for bid item "Macadam Stone Slope Protection" will be made on a square yard basis for slope protection constructed. The unit price bid per square yard shall include all costs for material and labor required to construct the slope protection shown on these plans.

The berm foreslope shaping and compacting and the disposal of excess soil from shaping or trenching shall be considered incidental to placing the slope protection.

Where erosion control work is completed, the Contractor shall be responsible for any plant materials destroyed adjacent to the slope protection area. The Contractor shall replant, reseed and mulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

The Bridge Contractor is to install subdrains as detailed on the Subdrain Details Sheet on Design Sheet No. 39.

Estimated Quantities		
Description	Location	Quantity
Macadam Slope Protection	West Abut.	547 Sq. Yds.
Total		547 Sq. Yds.

Items to be included in "Macadam Stone Slope Protection":

- Excavating, Shaping and Compacting
- Engineering Fabric
- Macadam Stone
- 4"x6" Treated Timber Edging
- ½"Ø Steel Pins (or Rebar)
- Porous Backfill or Granular Subbase Backfill at Front Face Abutment Footing

Design For 11°00'00" Skew (LA)

**224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge**

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Macadam Stone Slope Protection

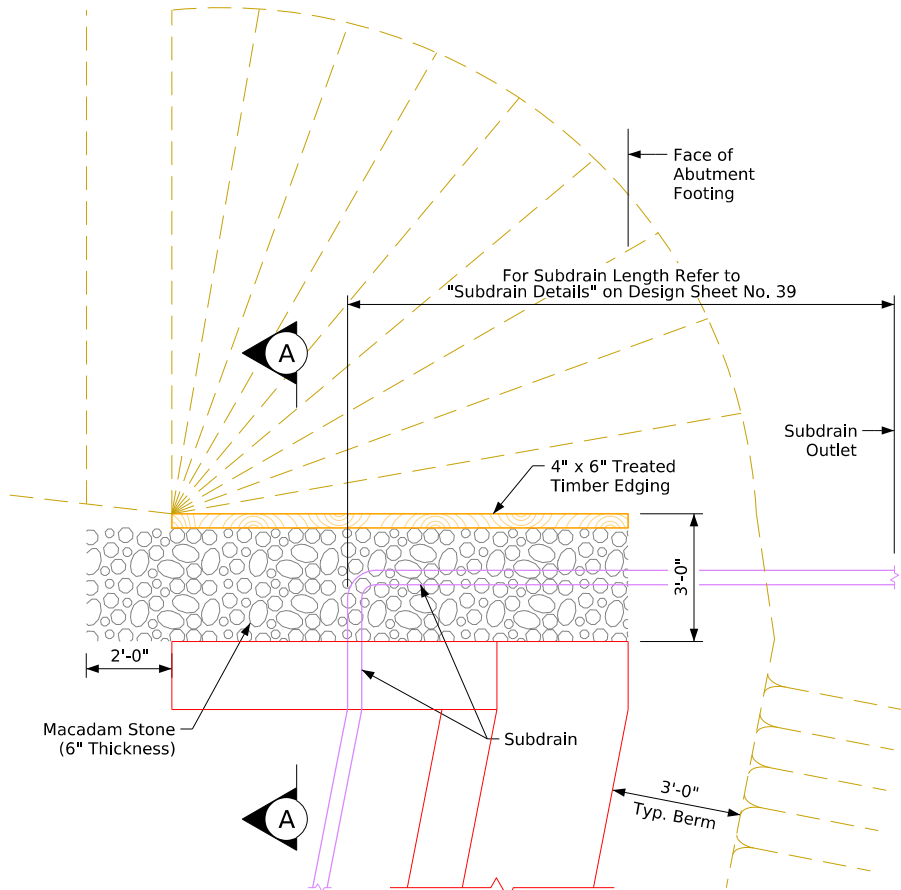
STA. 1131+93.78, 42.00' Rt. (Ų I-80 Existing) Turn-in Date: October, 2025

Polk County

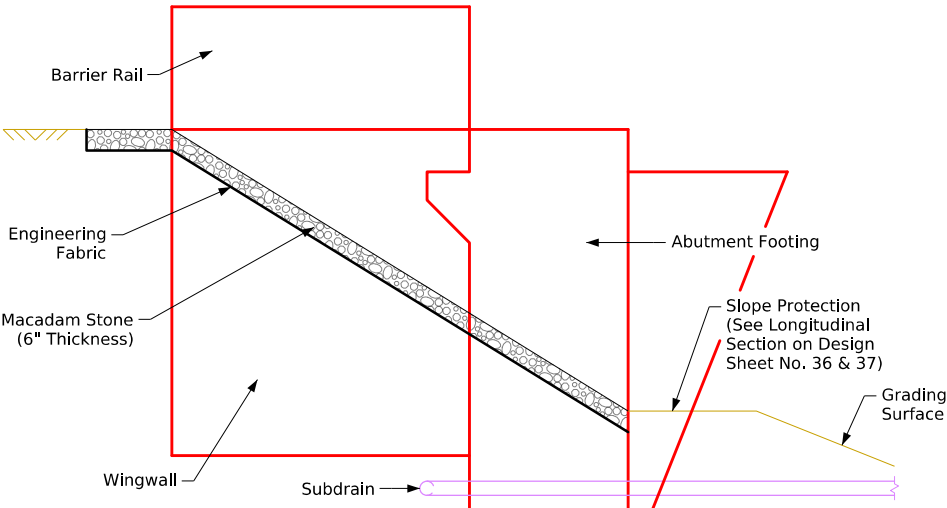
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226 Design Sheet No. 37 of 41 FHWA No. 041951

Revised 06-14 - Added 2 Feet Of Length Of Macadam Stone In Front Of The Bridge Wing.
ForeSlopeProtectionBridges.dgn - 1005 - This Sheet Issued 06-02.
ForeSlopeProtectionBridges.dgn - 1005 - This Sheet Issued 07-23.



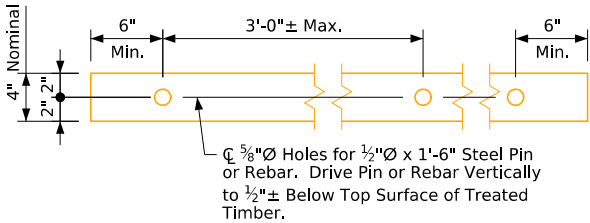
Top View of Wing Armoring



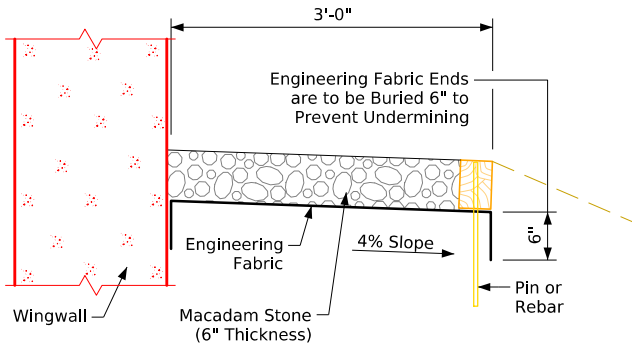
Profile View of Wing Armoring

Note:
The North Wing of the East Abutment
will not have Wing Armoring due to the
Temporary Wall.

A Check Shall be Made at the Subdrain Outlet
to Insure that it is Draining Properly During
the Backfill Flooding Process.



4"x6" Treated Timber
Edging Details



Section A-A

General Notes:

Macadam stone shall be placed along the sides of the wing 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 macadam stone at these locations shall be underlayed with engineering fabric in accordance with Article 4196.01, B, 3, of the Standard Specifications.

The macadam stone shall be in accordance with Section 4122, of the Standard Specifications, coarse material (no choke stone is allowed).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, in accordance with Section 4161, of the Standard Specifications.

The macadam stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform 6 inch 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, macadam stone, treated timber edging, excavation, shaping, and compaction to dimensions shown in these plans. Bid item shall be "Bridge Wing Armoring - Macadam Stone".

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

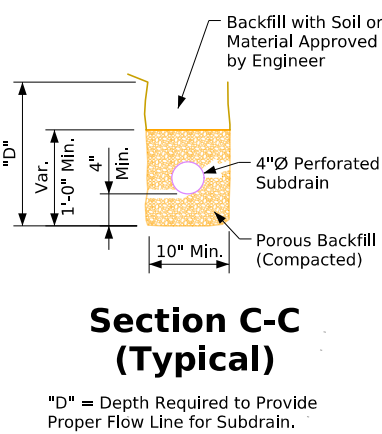
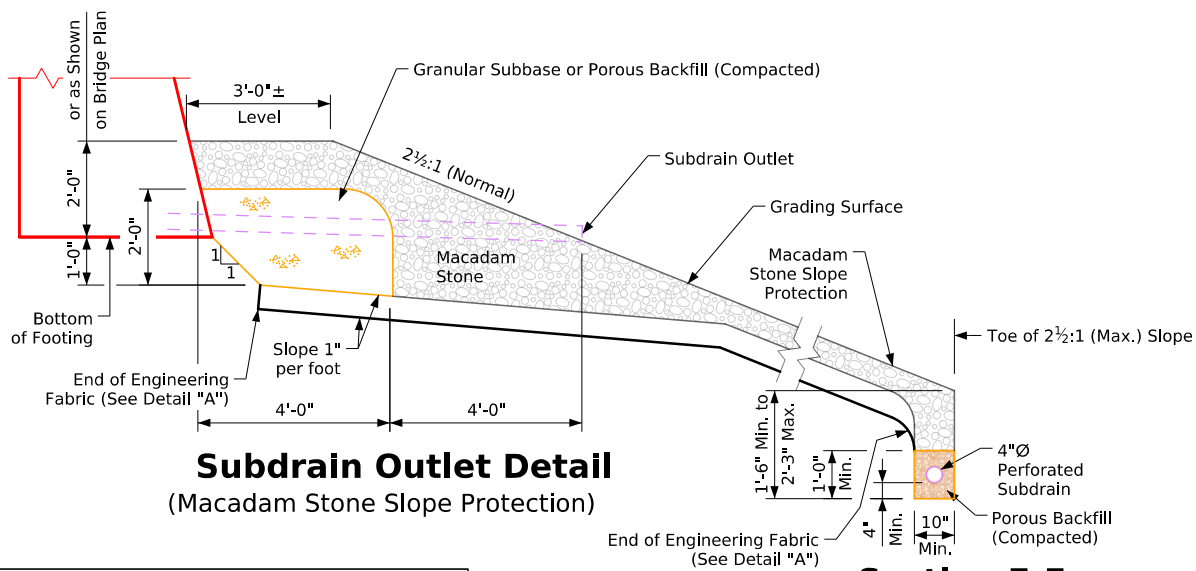
Bridge Wing Armoring

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

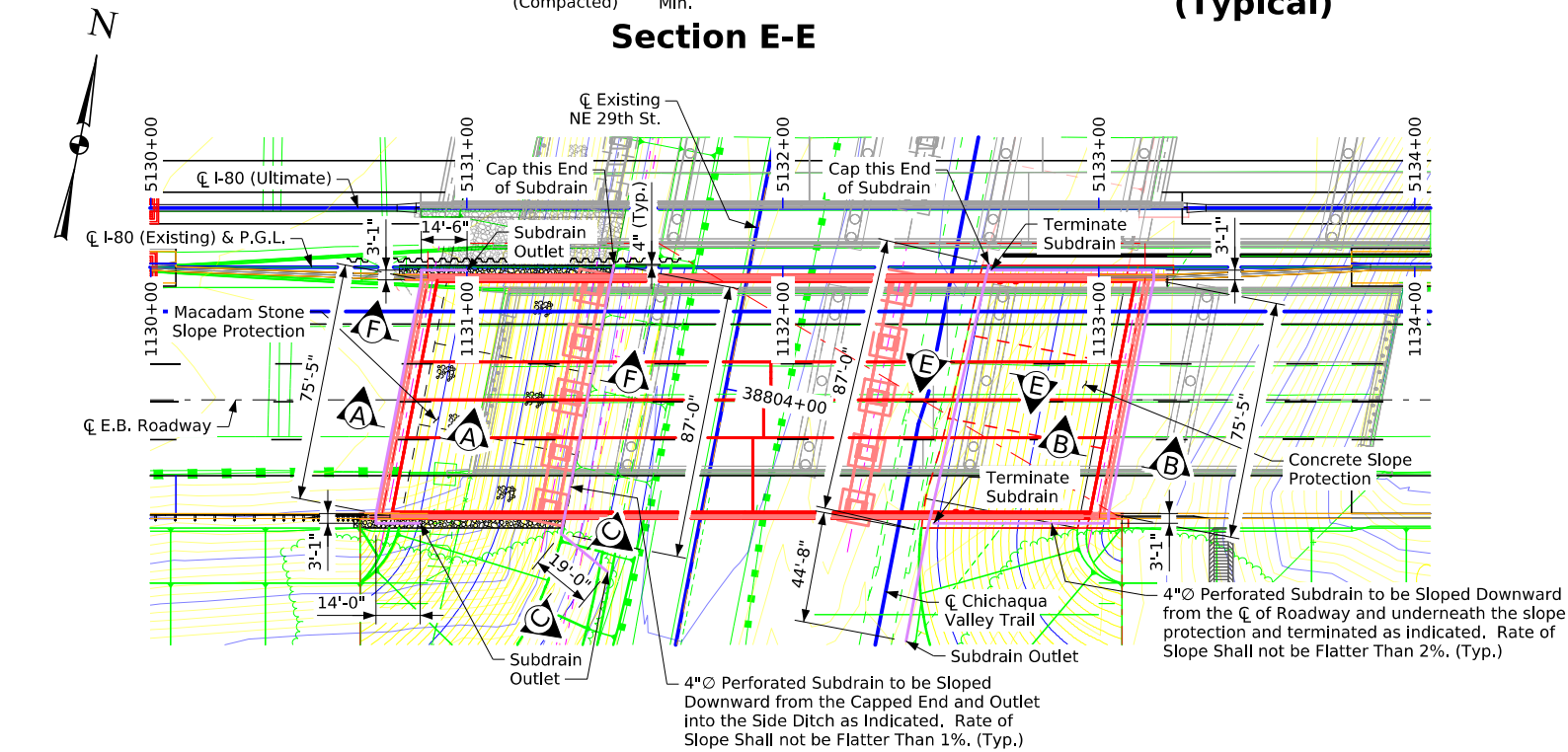
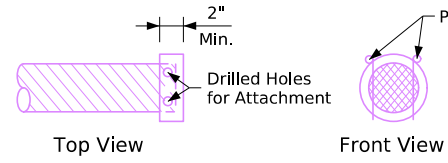
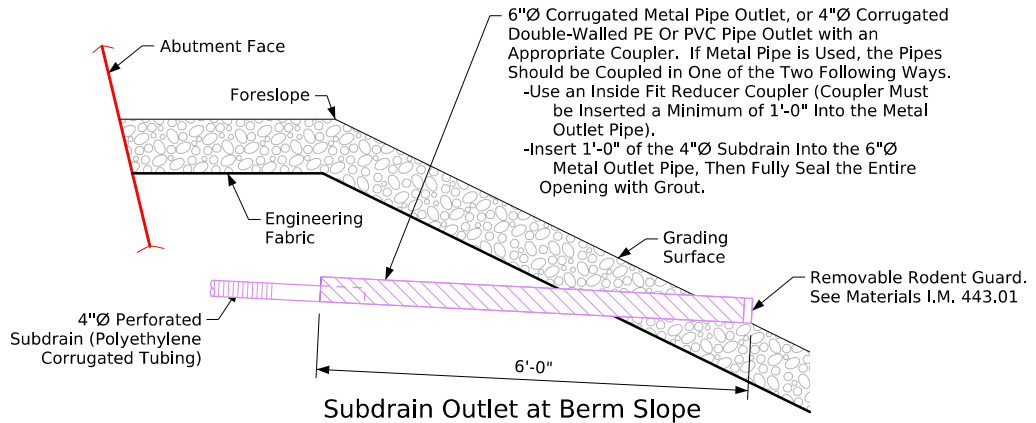
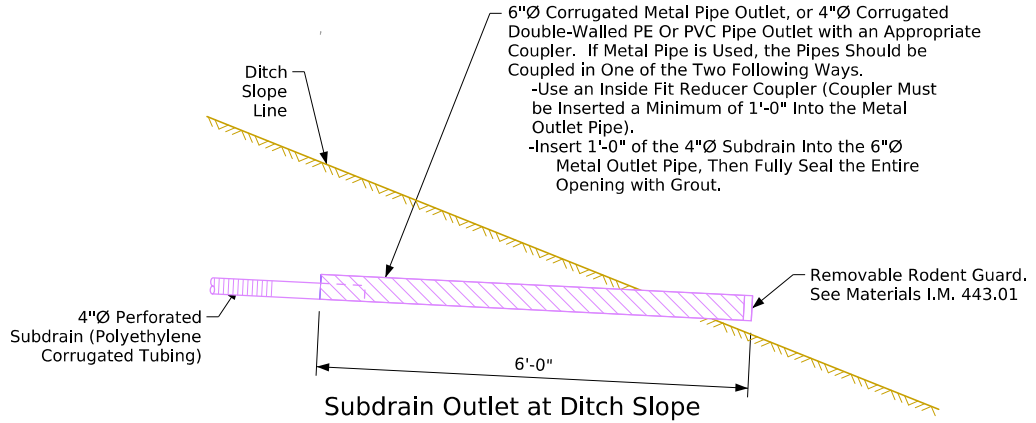
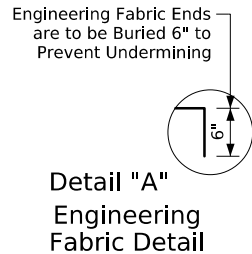
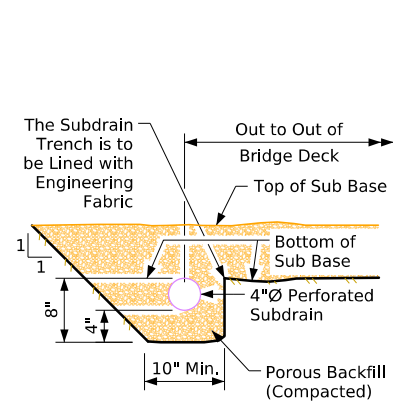
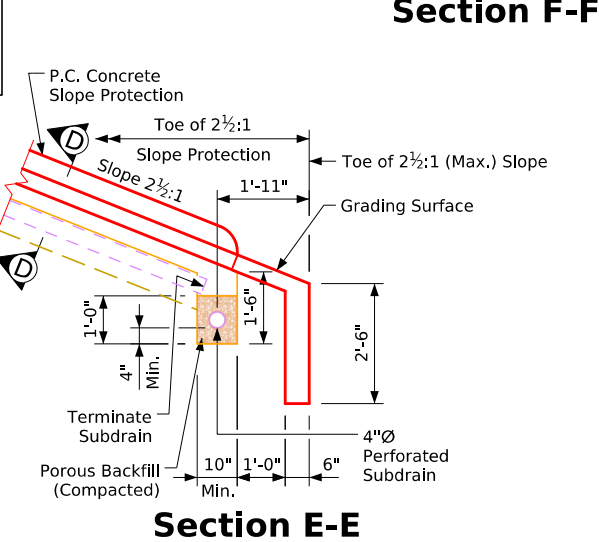
Polk County

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Design No. 226Design Sheet No. 38 of 41FHWA No. 041951



Note: Section A-A and Section B-B is shown on Abutment Backfill Details Sheet on Design Sheet Nos. 40 & 41.



Subdrain Outlet Elevations	
Location	Elevation
West Abutment	930.0
Toe of West Berm	909.0
Toe of East Berm	906.0

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

Subdrain Details

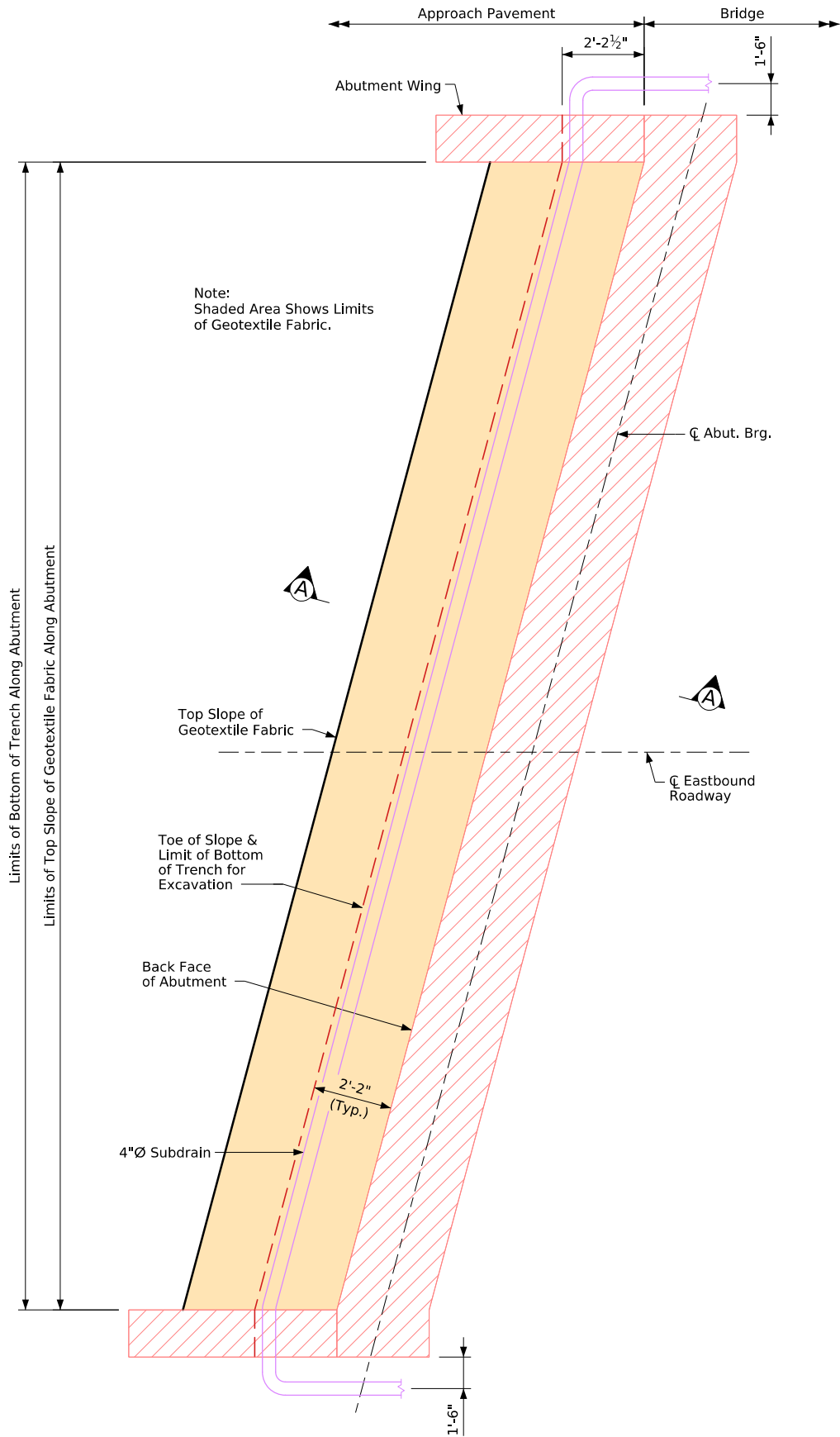
STA. 1131+93.78, 42.00' Rt. (C I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 39 of 41FHWA No. 041951

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 09-16 - Changed the Bridge Approach Pavement Standard to "BR" (was "RK").
ForeSlopeProtectionBridges.dgn - D, Abut Backfill - This Sheet Issued 08-07.
ForeSlopeProtectionBridges.dgn - D, Abut Backfill - This Sheet Redrawn 07-23.



West Abutment Plan without Wing Extensions

West 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 ft 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 ft 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 ft 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"Ø hose should be sprayed in successive 6 ft to 8 ft increments for 5 minutes within each increment.

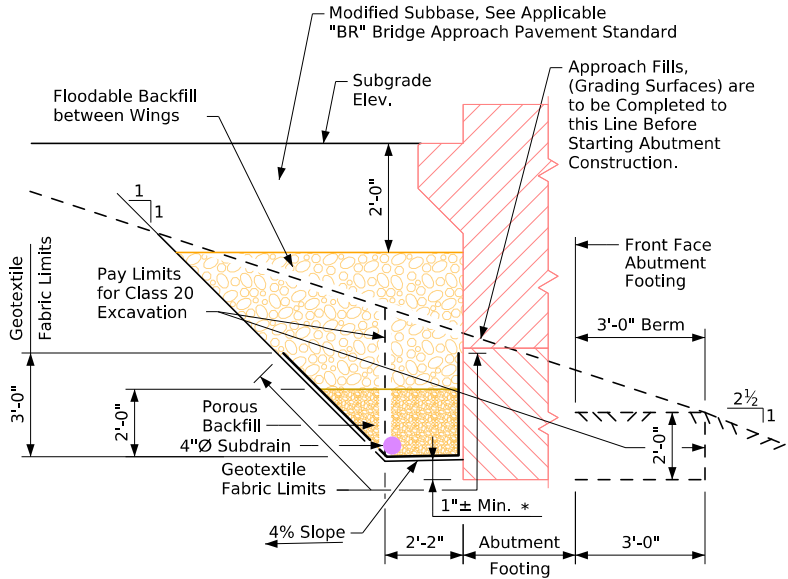
Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutment 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 abutment shall be included in the contract unit price bid for "High Performance Structural Concrete".

Note:
For Details not Shown on this Sheet which are Pertinent to this Structure, See Subdrain Details on Design Sheet No. 39.

Notes:
Subdrain shall slope downward 2% each way from CL Eastbound Roadway.
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 1 ft 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 Wing.
*Dimension Varies Due to 2% Subdrain Slope.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

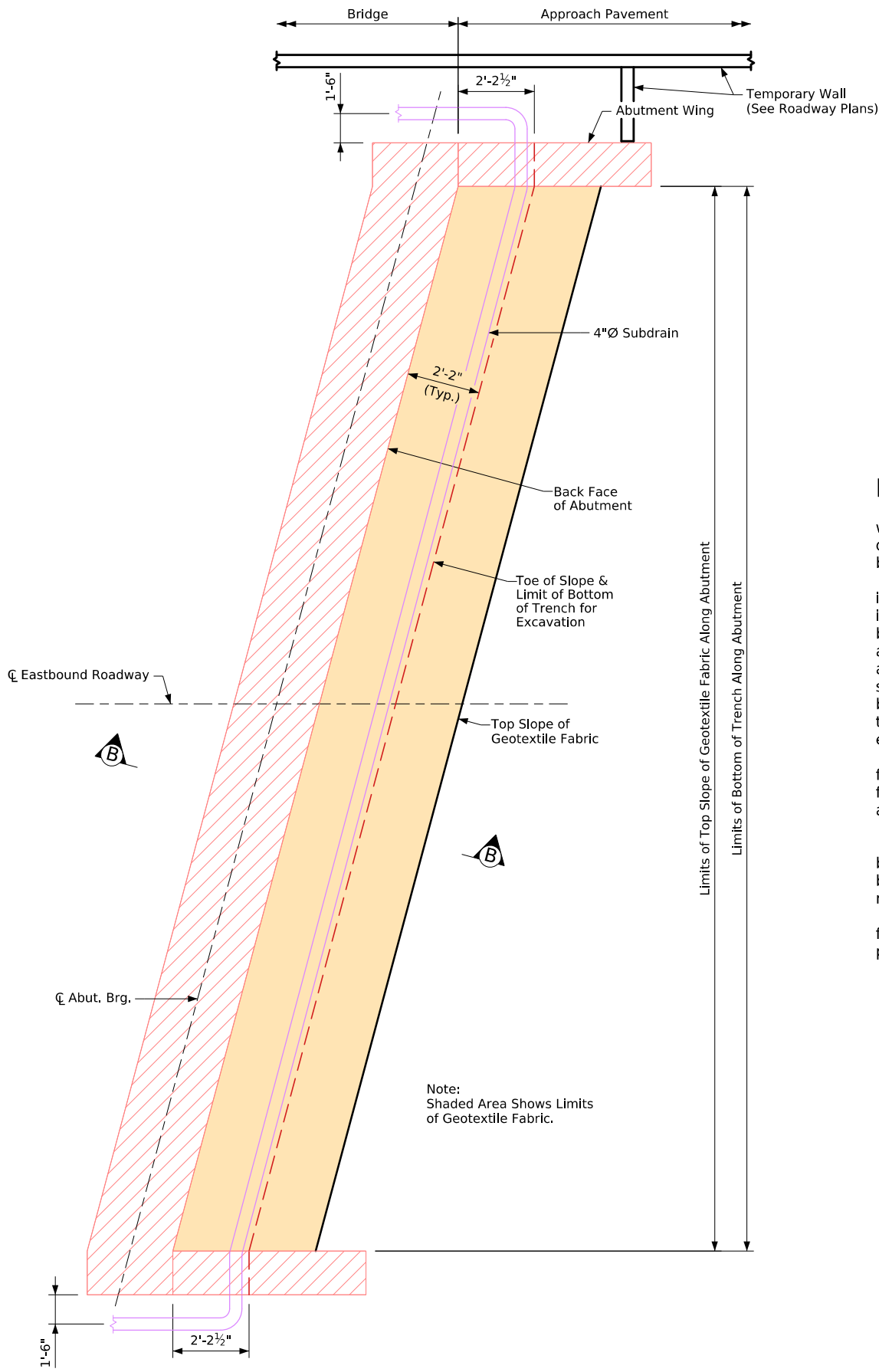
West Abutment Backfill Details

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 40 of 41FHWA No. 041951



East Abutment Plan without Wing Extensions

East 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 ft 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 ft 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.

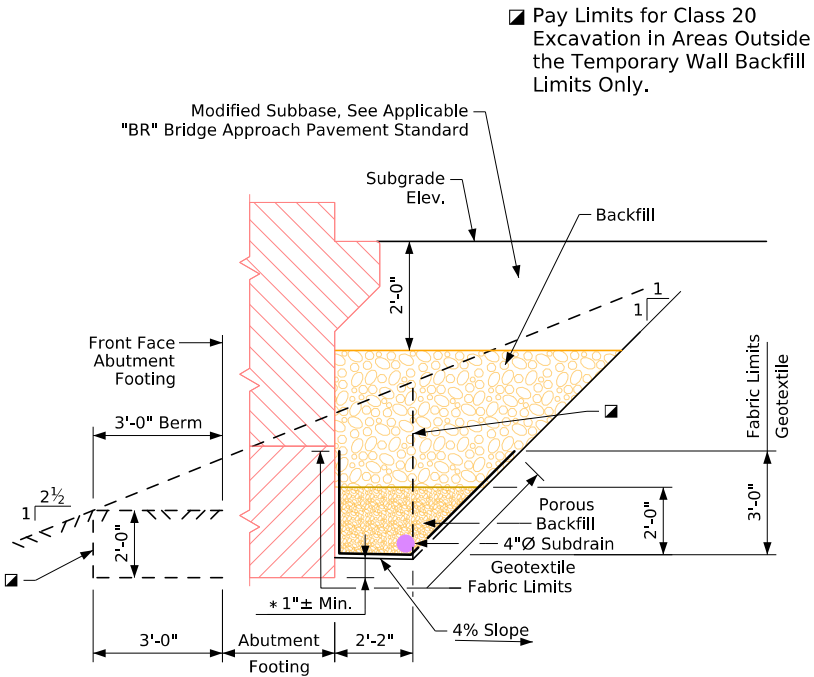
When the fabric is in place, the subdrain shall be installed directly on the fabric at the toe of the rear excavation slope. A slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

This abutment is situated within the limits of the temporary wall and the backfill shall be the same material as placed for the temporary wall, and it shall be placed in lifts and compacted the same way as the temporary wall backfill material. The Contractor will be prohibited from placing the backfill by flooding.

The cost of the abutment backfill, subdrains, porous backfill, and geotextile fabric furnished at the bridge abutment shall be included in the contract unit price bid for "High Performance Structural Concrete".

Note:
For Details not Shown on this Sheet which are Pertinent to this Structure, See Subdrain Details on Design Sheet No. 39.



Section B-B
Backfill Details

Note: Geotextile Fabric will be Attached to Face of Abutment Footing and Wing.

*Dimension Varies Due to 2% Subdrain Slope.

Notes:
Subdrain shall slope downward 2% each way from C Eastbound Roadway.

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 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.

Design For 11°00'00" Skew (LA)

224'-0" X 74'-0" Preten. Prestressed Concrete Beam Bridge

51'-0" & 76'-0" End Spans97'-0" Interior Span

East Abutment Backfill Details

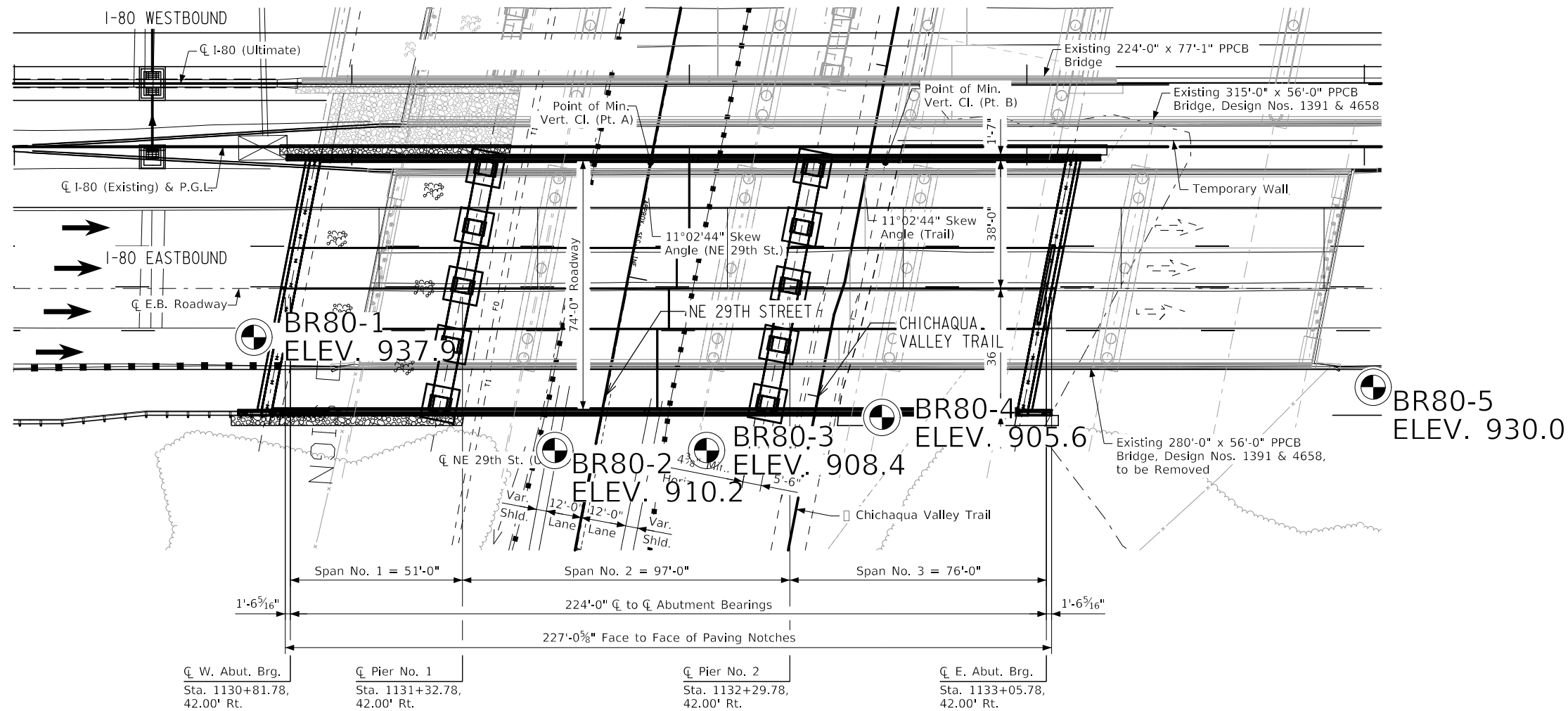
STA. 1131+93.78, 42.00' Rt. (C I-80 Existing)Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 226Design Sheet No. 41 of 41FHWA No. 041951





GEOTECHNICAL 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.

Brian T. Havens

5/22/2025

Signature **BRIAN T. HAVENS** Date

Printed or Typed Name

My license renewal date is December 31, 2026

Pages or sheets covered by this seal: SPS.1 AND SPS.2

LEGEND



EASTBOUND BORING

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

N



LOCATION

I-80 E.B. OVER 29TH ST.
T-79N R-23W
SECTIONS 17 & 18
DELAWARE TOWNSHIP
POLK COUNTY
FHWA NO. 41950
BRIDGE MAINT. NO. 7738.7R080
LATITUDE 41.654177°
LONGITUDE -93.560802°

0 40
Scale In Feet

Design For 11°00'00" Skew (LA)
224'-0" X 74'-0" Preten. Prestressed
Concrete Beam Bridge

51'-0" & 76'-0" End Spans 97'-0" Interior Span

Soil Profile Sheet

STA. 1131+93.78, 42.00' Rt. (CL I-80 Existing) Turn-in Date: October, 2025

Polk County

IOWA DEPARTMENT OF TRANSPORTATION
Design No. 226 Design Sheet No. 1 of 2 FHWA No. 041951

FILE NO. 32061

ENGLISH

DESIGN TEAM HDR

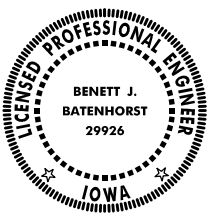

POLK COUNTY

PROJECT NUMBER 1M-NHS-080-4(87)139--03-77

SHEET NUMBER SPS.1

INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets
A.3	Title Sheet
C Sheets	Quantities and General Information
C.1	Project Description
C.1	Estimated Project Quantities and Reference Notes
C.1	Standard Road Plans
C.1	Index of Tabulations
C.1	General Notes
C.2	Tabulations
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
U Sheets	500 Series, Mod.Stds. and Detail Sheets
* U.1	Bridge Approach Detail
* U.2 - 9	Modified Standard Road Plans
	* Color Plan Sheets



ROADWAY DESIGN	
	<p>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.</p> <div><div>Signature </div><div>Date <u>9-18-2025</u></div></div> <div><div>Benett J. Batenhorst</div><div>Printed or Typed Name</div></div> <div><div>My license renewal date is December 31, 2026.</div></div>
Pages or sheets covered by this seal: <u>A.3, C.1-2, J.1, U.1-9</u>	

100-28
10-19-10

LONGITUDINAL GROOVING

Location	Total	Remarks
	SY	
W. Approach	562.5	
Bridge Deck	1743.1	
E. Approach	561.4	
Total:	2867.0	

108-13A
08-01-08

SAFETY CLOSURES

Refer to Section 2518 of the Standard Specifications

Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
1129+50.00		1	West Approach
1134+00.00		1	East Approach
Total:		2	

104-8A
04-19-22

SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN

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

Location			Bid Items	Scour Protection (DR-401)			Rock Flume (DR-402)			Remarks
Bridge Station	Bridge Corner	Distance	Bridge End Drain	Special Ditch Control, Wood Excelsior Mat	Turf Reinforced Mat (TRM), Type 2	Transition Mat	Macadam Stone Base	Engineering Fabric	Erosion Stone	
		DI-1 or DI-2		EC-101	EC-104	EC-105				
		FT		TYPE	SQ	SQ		SF	TONS	
1131+93.78	SE	32.3	DR-402				1.560	157.8	106.600	
						Totals:	1.560	157.8	106.600	

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	<div>T</div> <div>Thickness</div>	Pay Length	Non-Reinf. Pavement Area	Single-Reinf. Pavement Area	Double-Reinf. Pavement Area	Approach	Fixed or Movable Abutment	Abutting Pavement	Perforated Subdrain 4"	Subdrain Outlet			Porous Backfill	Class A Crushed Stone Backfill		Modified Subbase	Polymer Grid	Special Backfill
												Degrees	LF	STA						
		LEFT	RIGHT	Inches	FT	SY	SY					SY								
1131+93.78	West	11		12.0	72.3	264.0	174.1	191.9	BR-203 (MOD)	Movable	BR-211 (MOD)	102.0	1130+17.95	South	5.0		593.600	684.7		SEE NOTES (1), (2), and (3) Includes 12.5 Linear Feet and 5' Curb Runout of 4 Inch Sloped Curb
1131+93.78	East	11		12.0	72.7	263.6	173.3	191.1	BR-203 (MOD)	Movable	BR-211 (MOD)	102.0	1133+70.00	South	5.0		591.700	682.8		SEE NOTES (1), (2), and (3) Includes 22.7 Linear Feet and 5' Curb Runout of 4 Inch Sloped Curb
				Subtotals:		527.6	347.4	383.0												
				Totals:		1258.0						204.0			10.0		1185.300	1367.5		
				Notes:																
				(1)		Includes 58.6 SY (W End) and 58.2 SY (E End) of Non-Reinforced Section w/Barrier. Refer to Sheet U.6 for Modified BR-203 details														
				(2)		Includes 37.1 SY (W End) and 36.4 SY (E End) of Single Reinforced Section w/Barrier. Refer to Sheet U.7 for Modified BR-203 details														
				(3)		Includes 49.1 SY (W End) and 27.6 SY (E End) of Double Reinforced Section w/Barrier. Refer to Sheet U.8 for Modified BR-203 details														

108-18B
MODIFIED

CONCRETE BARRIER AT SIDE LOCATIONS

Refer to BA-102, BA-103, BA-104, BA-105, BA-106, BA-107, and BA-150.

① Lane(s) to which the installation is adjacent.
② Refer to the Bridge Approach tabulation (112-6) for quantities.
* Bid Item

Location					<div>L2</div> <div>Offset</div>	Side Barrier				Remarks	Expansion Joints			
No.	<div>①</div> <div>Direction of Traffic</div>	Station to Station		Side		Barrier Type (BA-102, BA-103, or BA-104)	<div>L</div> <div>Length of Barrier*</div>	BA-105 Transition Section*	BA-107 End Section*		Reinforced Paved <div>②</div> Shoulder (Required?)	Station	Side	Remarks
1	EB	1130+07.95	1130+80.64	LT	16.5-14.0	MOD BA-104	72.7			YES	1130+17.95	LT		
2	EB	1133+21.70	1133+80.00	LT	14.0-16.5	MOD BA-104	58.4			YES	1133+70.00	LT		
						Total:	131.1							

FILE NO. 32061

ENGLISH

DESIGN TEAM Iowa DOT \ HDR

POLK COUNTY

PROJECT NUMBER IM-NHS-080-4(87)139--03-77

SHEET NUMBER C.2

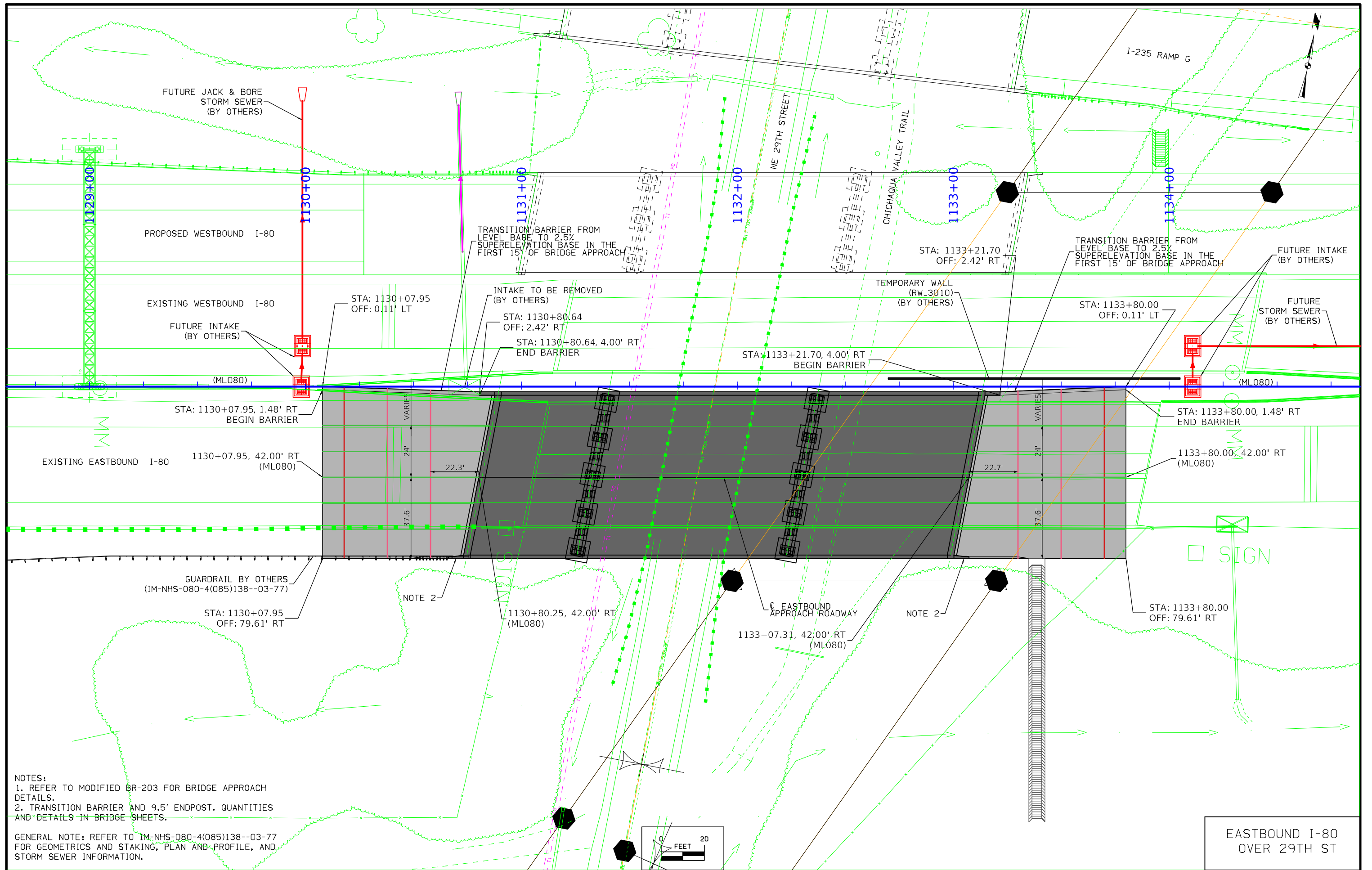
9/8/2025

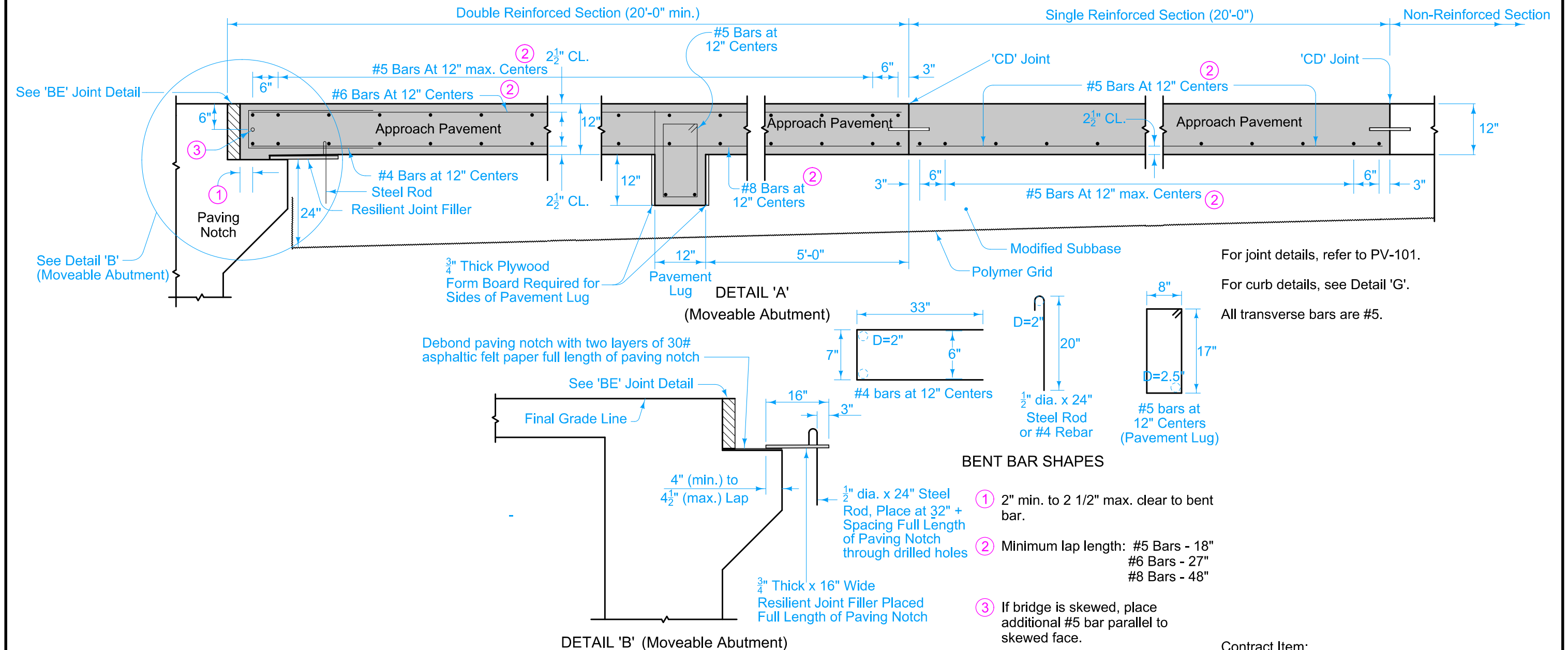
12:28:06 PM

WBEHREND

c:\pwworking\central01\d5036253\SHT_77080087_C01.xlsm

TRAFFIC CONTROL PLAN		108-23A 08-01-08
Refer to IM-NHS-080-4(085)138--03-77 Grading and New Plan for the Traffic Control Plan.		
Traffic Control Notes:		
The following projects are tied:		
IM-NHS-080-4(085)138--03-77 Grade and New		
IM-NHS-080-4(87)139--03-77 Bridge Design No. 226		
IM-NHS-080-4(88)139--03-77 Bridge Design No. 326		
The Project Traffic Control Plan and Staging Notes are included in the (085) Grade and New Plan and will involve all traffic control as detailed in the Traffic Control Plan, Staging Notes and traffic control sheets.		
Traffic Control responsibilities may be delegated between projects. Each Contractor will be responsible for complying with all the requirements outlined in the Traffic Control Plan, and coordinating activities to insure compliance.		

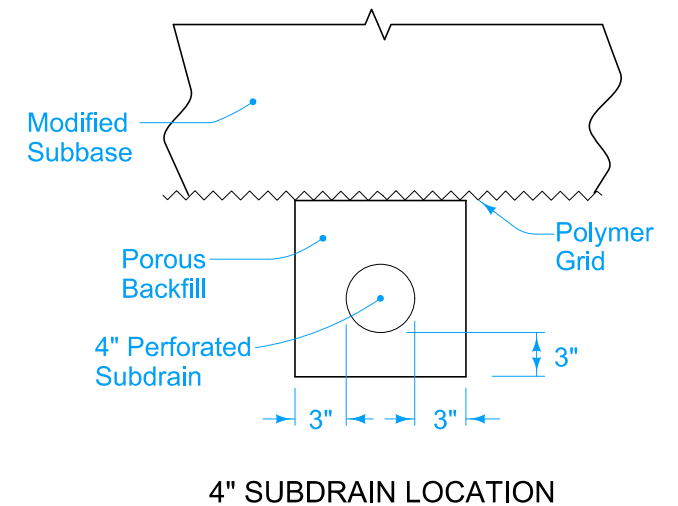
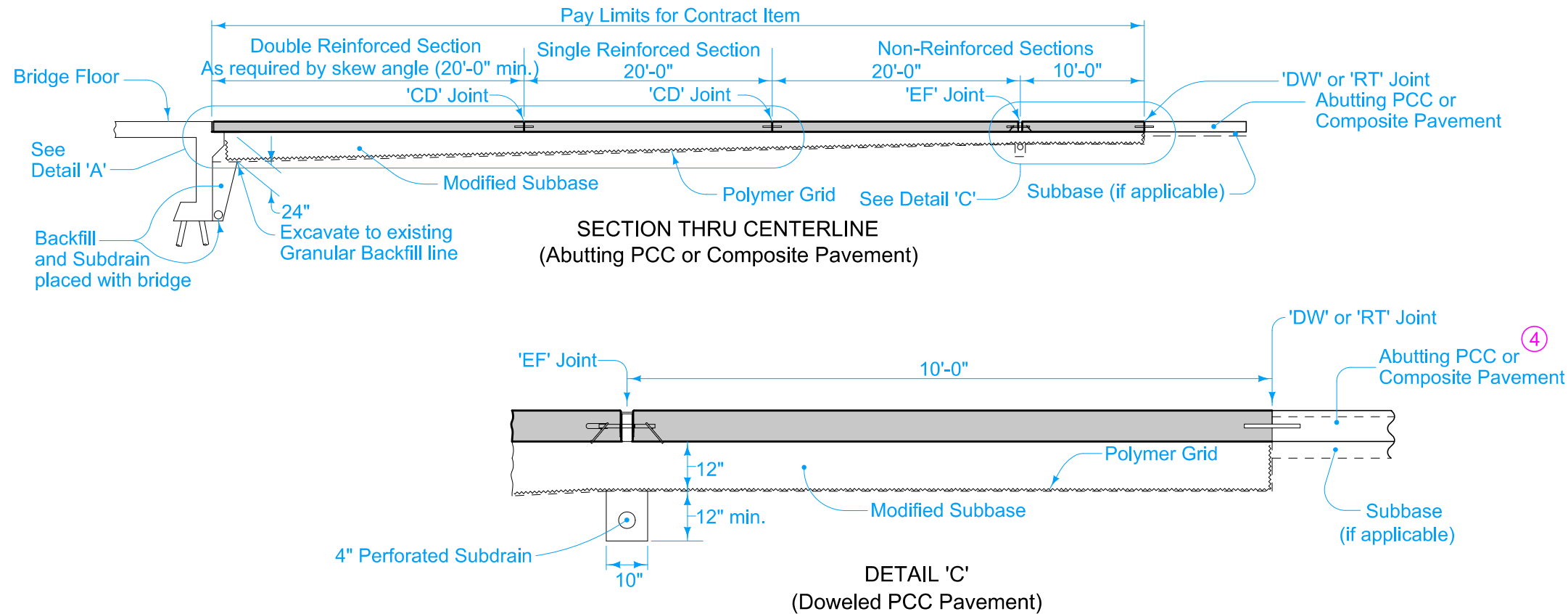




Contract Item:
Bridge Approach, BR-203 Modified
Longitudinal Grooving in Concrete, Bridge Deck

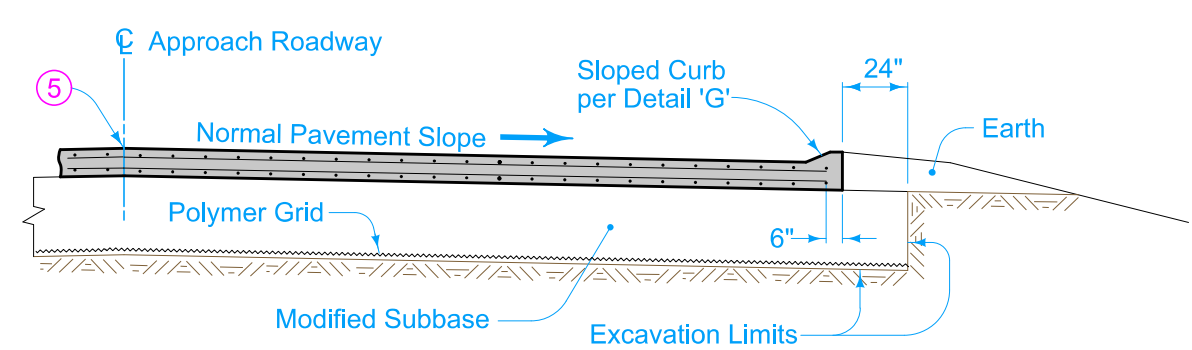
Tabulation:
112-6

MODIFIED STANDARD ROAD PLAN	REVISION	
	4	10-15-24
BR-203		
SHEET 1 of 6		
MODIFICATIONS: Added details for barrier within bridge approach section.		
APPROVED BY DESIGN METHODS ENGINEER		
DOUBLE REINFORCED 12" APPROACH		

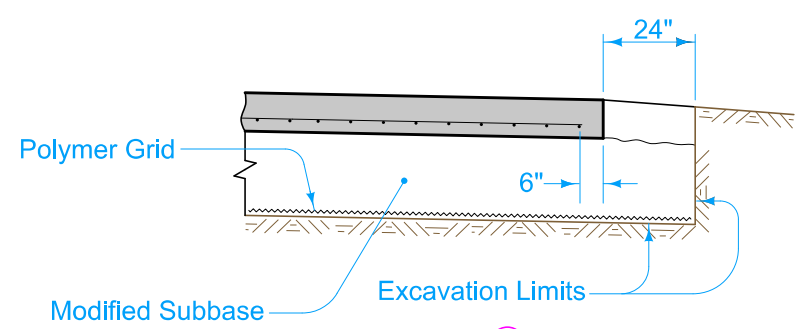


④ If abutting pavement (PCC or HMA) is not in place, refer to BR-213.

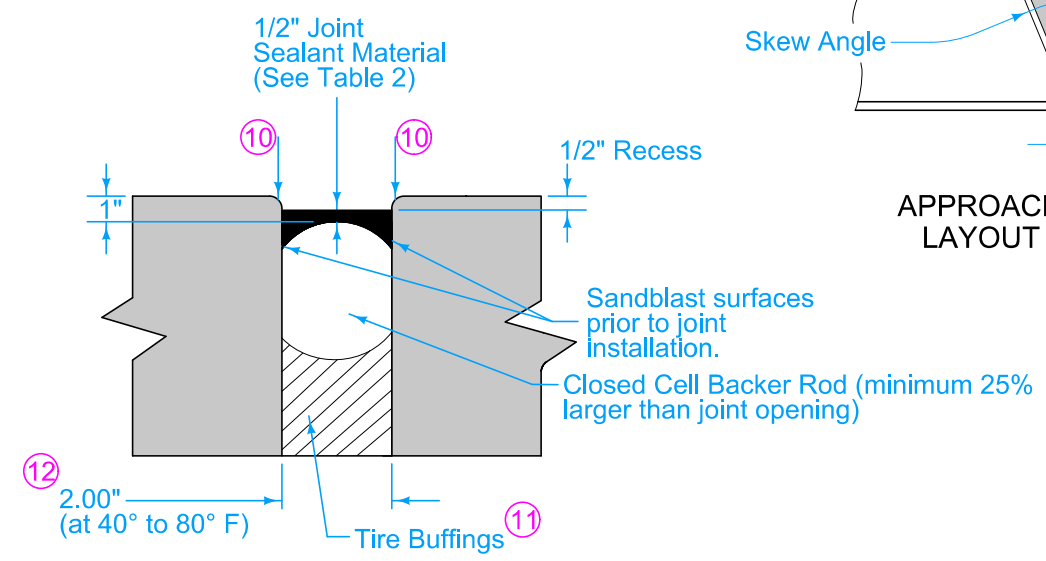
MODIFIED STANDARD ROAD PLAN	REVISION	
	4	10-15-24
BR-203		
SHEET 2 of 6		
MODIFICATIONS: Added details for barrier within bridge approach section.		
APPROVED BY DESIGN METHODS ENGINEER		
DOUBLE REINFORCED 12" APPROACH		



SECTION A-A

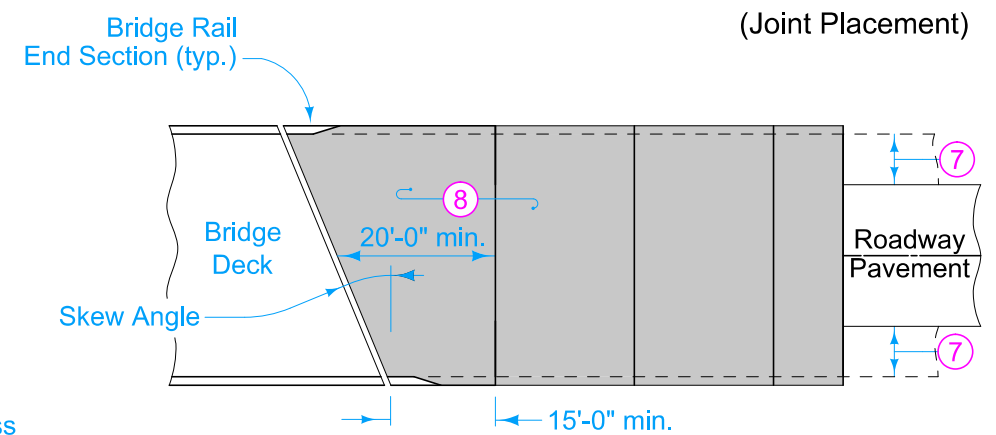


SECTION B-B

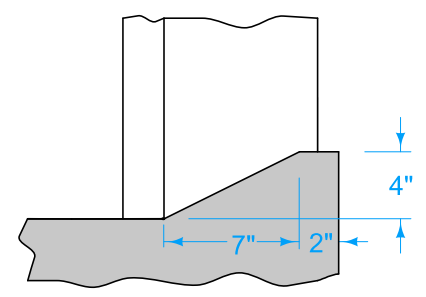


'BE' JOINT DETAIL

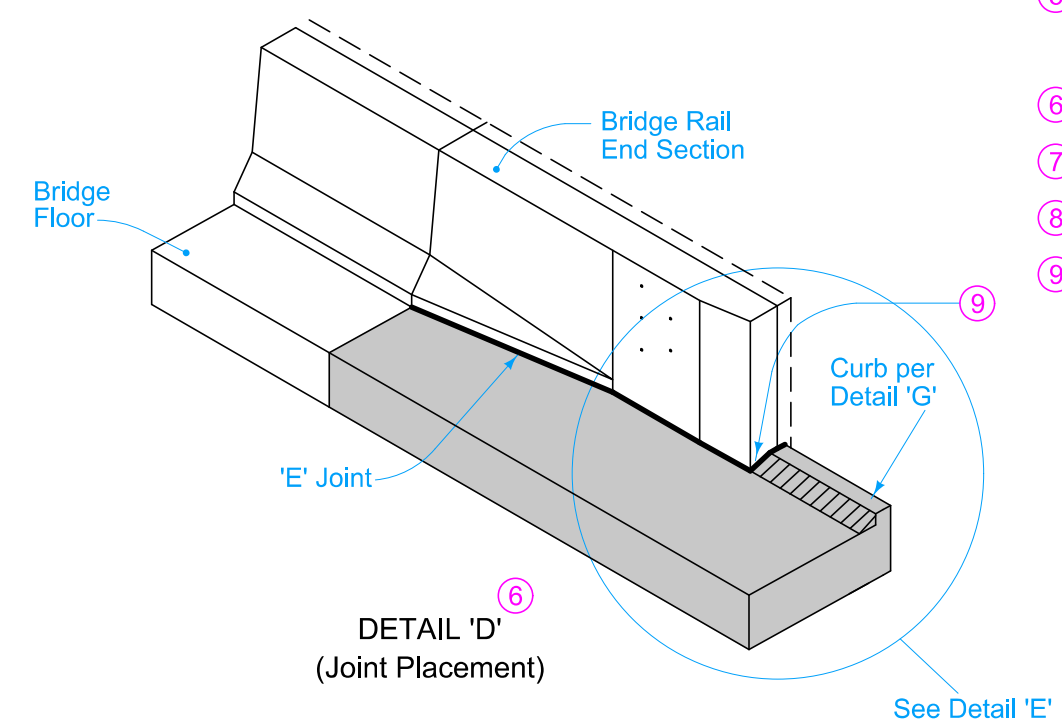
Table 2
Approved List of Sealant
Dow - Dowsil 902 RCS
Sika - Sikasil 728 RCS
Watson Bowman Acme - Wabo SiliconeSeal
Pecora - 322FC



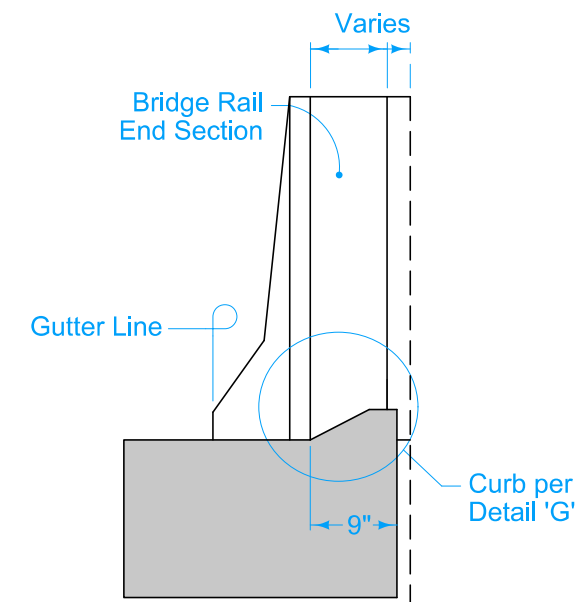
APPROACH PAVEMENT LAYOUT AT A SKEW



DETAIL 'G'



DETAIL 'D' (Joint Placement)



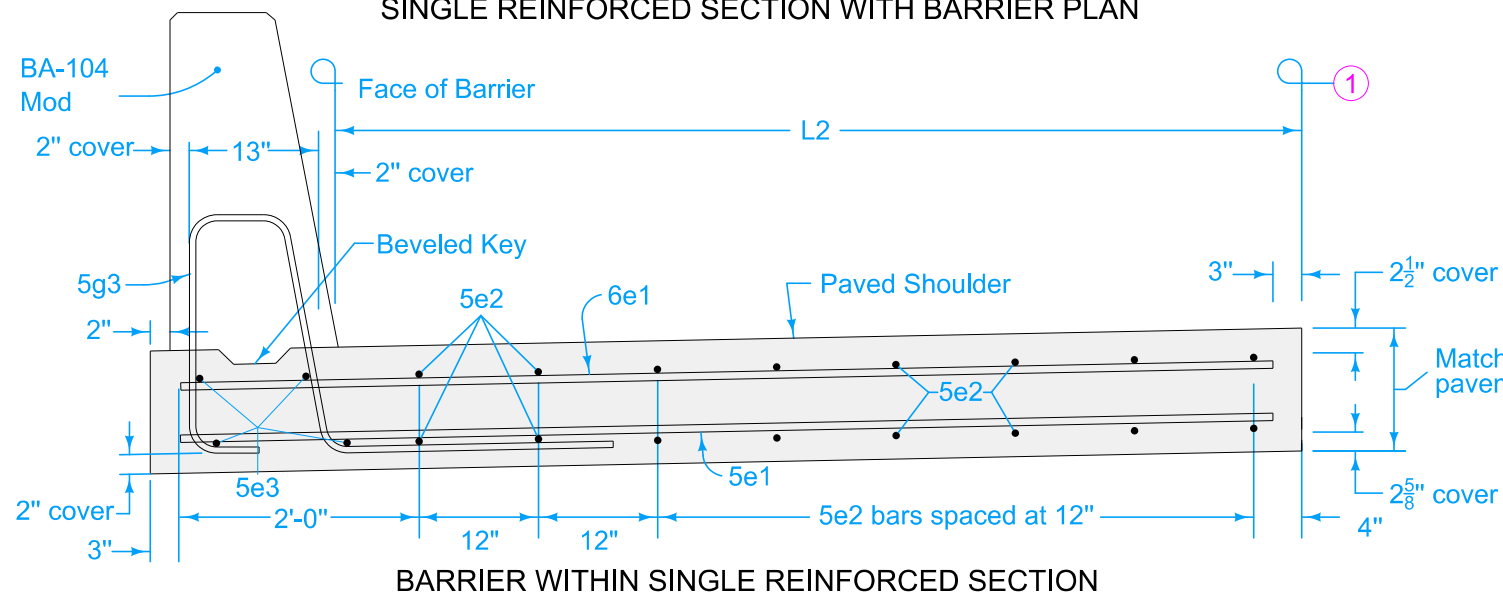
DETAIL 'E' (Back of Curb Placement)

- ⑤ Longitudinal Joint (PV-101):
Single pour - Saw cut joint per Detail B.
Two pours - Use 'KS-2' Joint.
- ⑥ Refer to Modified BR-211.
- ⑦ Design shoulder width.
- ⑧ Reinforced bridge approach section.
- ⑨ Joint at end of Bridge Rail End Section: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.
- Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler complying with Section 4136 of the Standard Specifications.
Set width of gap to 2 inches. Joint length as required to completely fill from back side of curb to front face of bridge wing.
Set width of gap to 2 inches. Joint length as required to completely fill from back side of roadway barrier to face of bridge barrier.
- ⑩ Edge with 1/4 inch tool for length of joint indicated if formed edging not required when cut with diamond blade saw.
- ⑪ Compact tire buffings by spading with a square-nose shovel. Tire buffings shall not be larger than 1/2 inch.
- ⑫ Setting Width Notes:
 - Width is perpendicular to abutment.
 - Temperature of concrete deck on the underside or shaded portion of the deck shall be between 40 to 80 degrees Fahrenheit when placing approach slab concrete.
 - This 'BE' joint and the setting temperatures may be used for all concrete beam or slab bridges up to 575' in length and for all steel girder bridges up to 400' in length.

MODIFIED STANDARD ROAD PLAN	REVISION	
	4	10-15-24
	BR-203	
SHEET 3 of 6		
MODIFICATIONS: Added details for barrier within bridge approach section.		
APPROVED BY DESIGN METHODS ENGINEER		
DOUBLE REINFORCED 12" APPROACH		

Beveled Key

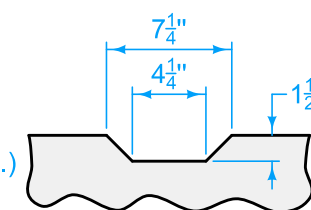
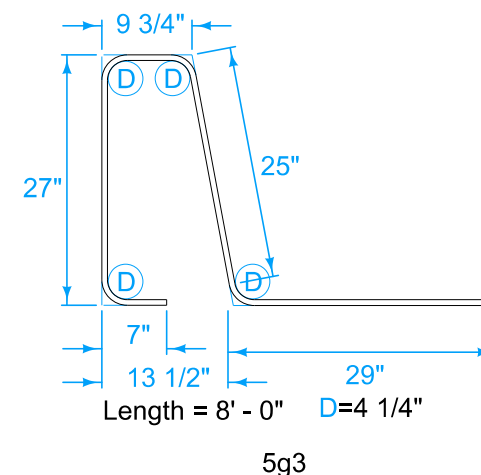
SINGLE REINFORCED SECTION WITH BARRIER PLAN



BARRIER WITHIN SINGLE REINFORCED SECTION

REINFORCING BAR LIST				
Per Shoulder Panel (Approximately 17 Linear Feet)				
L2	Bar	Number of Bars	Length	Spacing
10'	5e1	19	11'-1"	12"
	5e2	8	16'-6"	12"
	6e1	19	11'-1"	12"
12'	5e1	19	13'-1"	12"
	5e2	12	16'-6"	12"
	6e1	19	13'-1"	12"
14'	5e1	19	15'-1"	12"
	5e2	16	16'-6"	12"
	6e1	19	15'-1"	12"
16'	5e1	19	17'-1"	12"
	5e2	20	16'-6"	12"
	6e1	19	17'-1"	12"
18'	5e1	19	19'-1"	12"
	5e2	24	16'-6"	12"
	6e1	19	19'-1"	12"
Applies to all Shoulder Widths	5e3	4	16'-6"	See Drawing
	5g3	varies	8'-0"	(3)

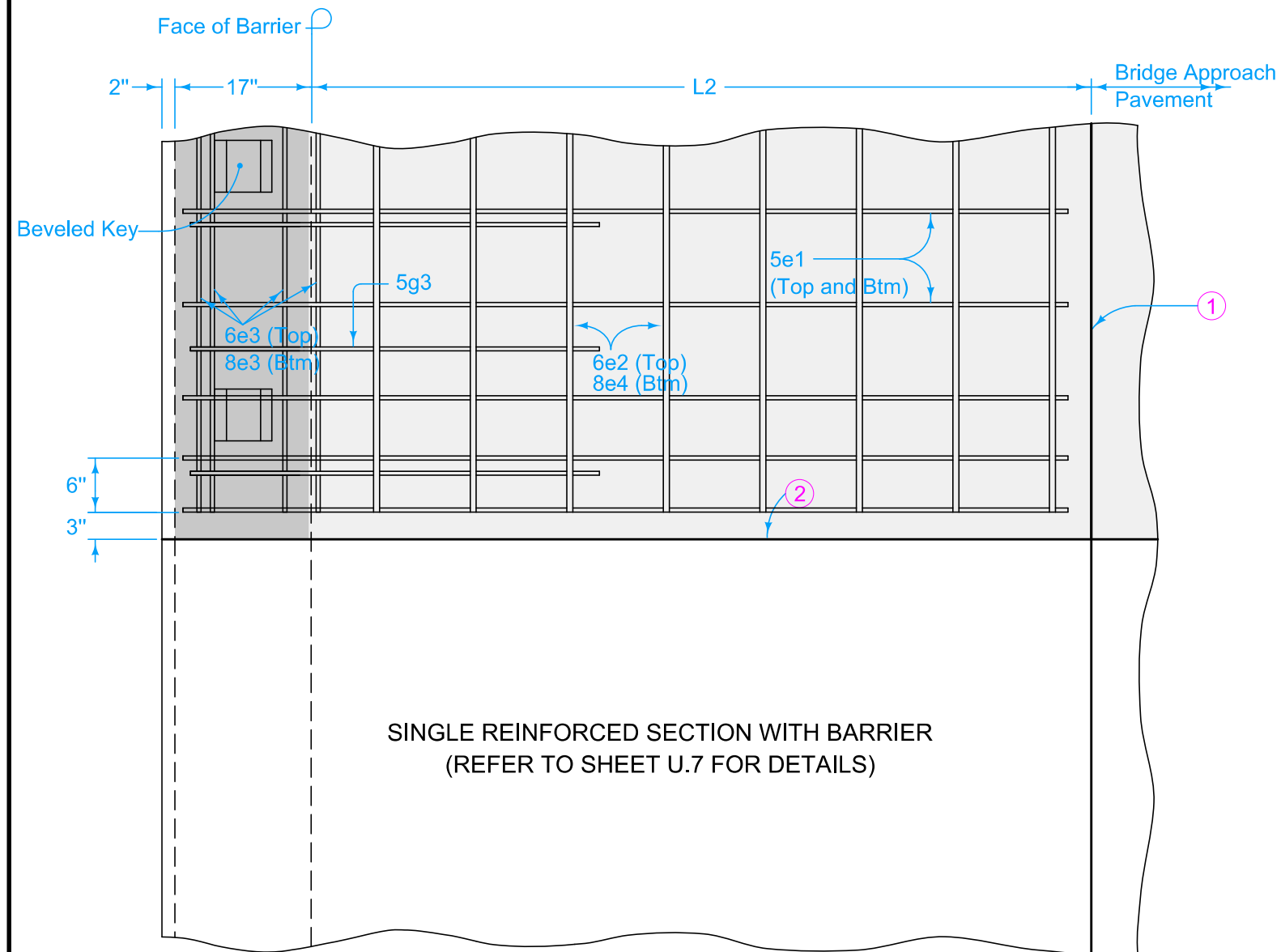
- ① Longitudinal jointing per Modified BR-211.
- ② Transverse jointing per Modified BR-211.
- ③ Match spacing of vertical bars in concrete barrier.



BEVELED KEY

Use 2 x 8 lumber 8" long to make keys.
Place keys at 2'-8" centers.

MODIFIED	REVISION	
	4	10-15-24
STANDARD ROAD PLAN	BR-203	
SHEET 5 of 6		
MODIFICATIONS: Added details for barrier within bridge approach section.		
APPROVED BY DESIGN METHODS ENGINEER		
DOUBLE REINFORCED 12" APPROACH		

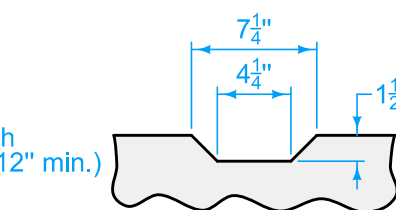
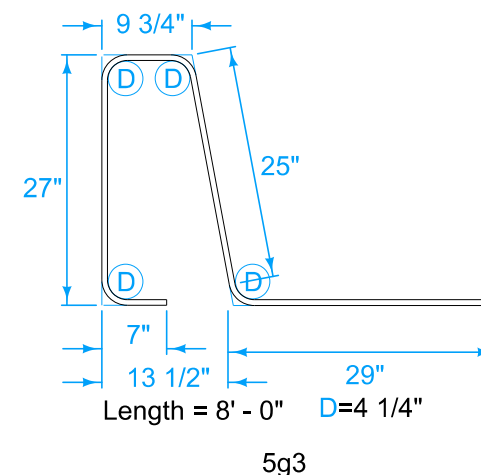


SINGLE REINFORCED SECTION WITH BARRIER
(REFER TO SHEET U.7 FOR DETAILS)

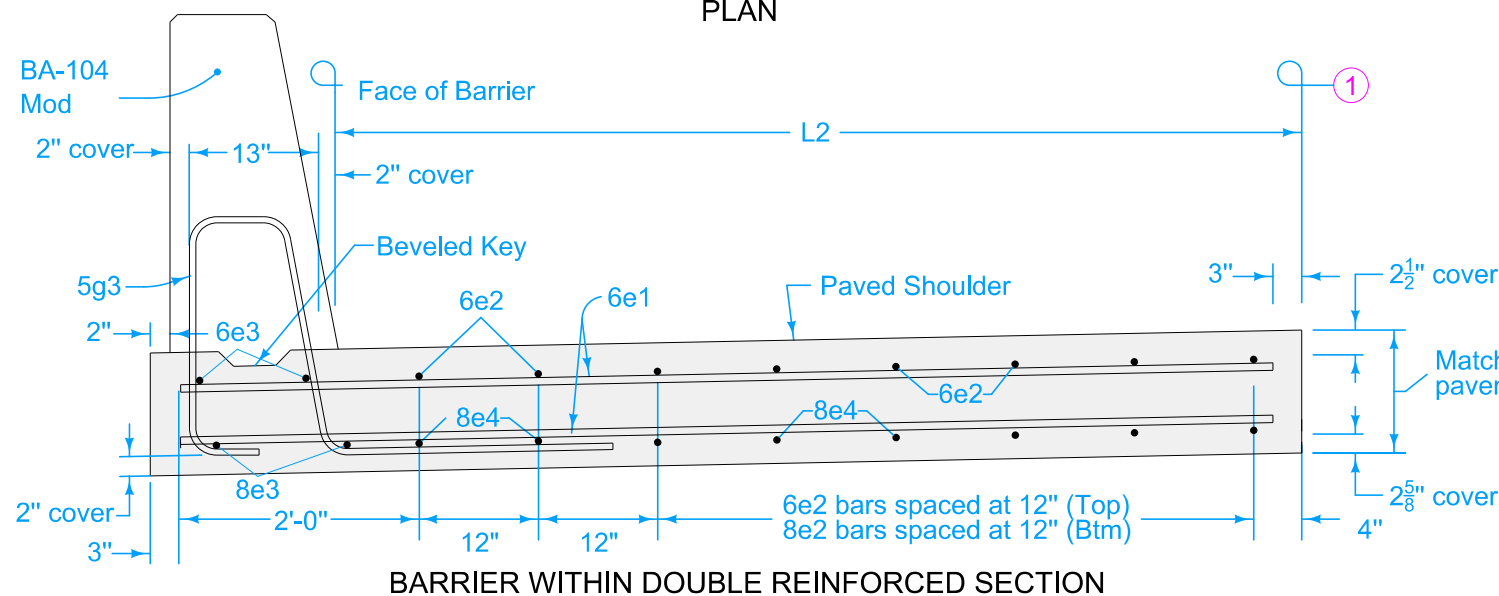
PLAN

REINFORCING BAR LIST Per Shoulder Panel (Approximately 17 Linear Feet)				
L2	Bar	Number of Bars	Length	Spacing
10'	6e1	38	11'-1"	12"
	6e2	4	16'-6"	12"
	8e4	4	16'-6"	12"
12'	6e1	38	13'-1"	12"
	6e2	6	16'-6"	12"
	8e4	6	16'-6"	12"
14'	6e1	38	15'-1"	12"
	6e2	8	16'-6"	12"
	8e4	8	16'-6"	12"
16'	6e1	38	17'-1"	12"
	6e2	10	16'-6"	12"
	8e4	10	16'-6"	12"
18'	6e1	38	19'-1"	12"
	6e2	12	16'-6"	12"
	8e4	12	16'-6"	12"
Applies to all Shoulder Widths	6e3	2	16'-6"	See Drawing
	8e3	2	16'-6"	See Drawing
	5g3	varies	8'-0"	③

- ① Longitudinal jointing per Modified BR-211.
- ② Transverse jointing per Modified BR-211.
- ③ Match spacing of vertical bars in concrete barrier.



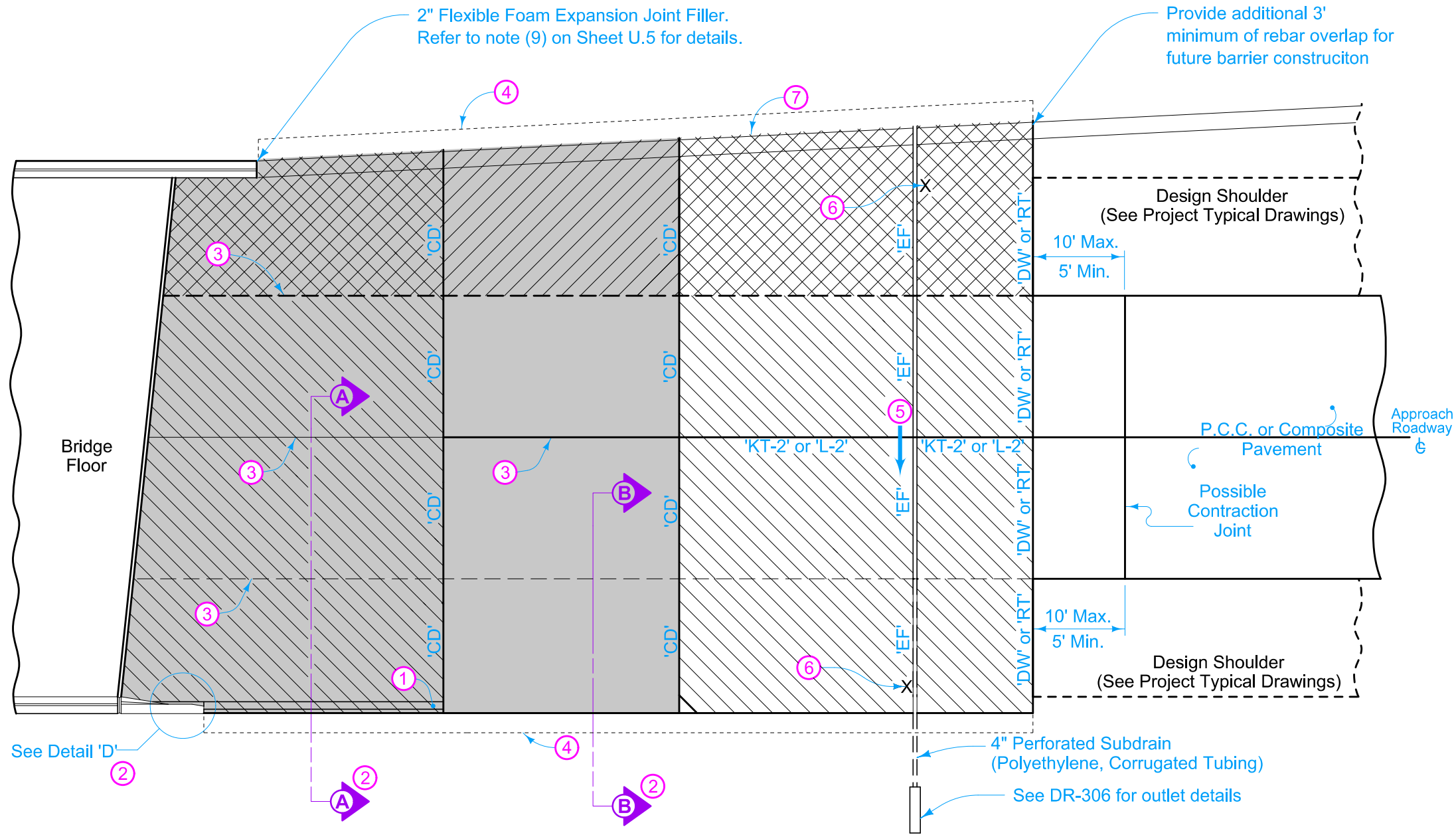
Use 2 x 8 lumber 8" long to make keys.
Place keys at 2'-8" centers.



BARRIER WITHIN DOUBLE REINFORCED SECTION

MODIFIED STANDARD ROAD PLAN	REVISION	
	4	10-15-24
BR-203		
SHEET 6 of 6		
MODIFICATIONS: Added details for barrier within bridge approach section.		
APPROVED BY DESIGN METHODS ENGINEER		
DOUBLE REINFORCED 12" APPROACH		

For joint details, see PV-101.



- 1 Build 4 inch Sloped Curb to end of Double Reinforced Section. Refer to PV-102 for curb and runout details.
- 2 See Mod BR-203.
- 3 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).
- 4 Polymer Grid and excavation limits of Modified Subbase 2 feet outside of pavement edge. See Mod BR-203.
- 5 Slope subdrain to drain.
- 6 Place an "X" in the plastic concrete near the 'EF' joint at the outside edge of pavement.
- 7 See Sheet U.1 for barrier layout details. See Mod BA-104 and Mod BR-203 for barrier dimensions and reinforcing details.

PLAN VIEW

Pay limits for contract item include the following areas:

- | | |
|---------------------------|--|
| Double Reinforced Section | Double Reinforced Section w/ Barrier (See Mod BR-203 on Sheet U.8) |
| Single Reinforced Section | Single Reinforced Section w/ Barrier (See Mod BR-203 on Sheet U.7) |
| Non-Reinforced Section | Non-Reinforced Section w/ Barrier (See Mod BR-203 on Sheet U.6) |

MODIFIED STANDARD ROAD PLAN	REVISION	
	3	10-18-22
BR-211		
SHEET 1 of 1		
MODIFICATIONS: Revised bridge approach to include flared section with barrier.		
APPROVED BY DESIGN METHODS ENGINEER		
BRIDGE APPROACH (ABUTTING PCC OR COMPOSITE PAVEMENT)		