



J40-25 CONTINUOUS CONCRETE SLAB BRIDGE STANDARDS

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J40-25 Bridge Standards - General Notes

The J40-25 Bridge Standards, if properly used, provide the structural plans necessary to construct 3-span 40'-0" roadway continuous concrete slab bridges with lengths of 70, 80, 90, 100, 110, 120, 130, 140 and 150ft.

These bridges may be built on a 0°, 15°, 30° or 45° skew. These plans show the bridges skewed in one direction, but all dimensions and details would be the same for the opposite skew.

These standards give most of the information necessary to build these bridges. However, the following additional information is required for use on primary routes. For secondary routes the Engineer may not require all sheets to be provided:

1. Title Sheet With Engineer's Seal
2. Estimated Quantities Totals Including Bid Item "Class 20 Excavation" for Bridge
3. Situation Plan Layout of Bridge
4. Top of Slab Elevations Layout
5. Bottom of Abutment Footing Elevations
6. Bottom of Pier Cap Elevations
7. Piling Design Information
8. Slope Protection Layout (if needed)
9. Conduit Layout
10. Lighting Layout (if needed)

For clarity, most sections shown on the following sheets are drawn with single slope barrier rail only. These sections will be identical for open rail barriers with any modifications shown on Open Rail Barrier Details Sheet J40-52-25 and Open Rail Barrier Quantities Sheet J40-53-25.

Note, that when approach pavement is to be placed, the temporary paving blocks shall be removed. The abutments for these bridges are built integral with the superstructure. Therefore, it is important that a proper joint for expansion be provided. The BR-205 double reinforced 12-inch approach standard road plan shall be used with the J40 Standards. This standard ties the approaches to the integral (movable) abutment and provides expansion movement (BE joint) at the end of the first approach slab panel.

All reinforcing bars and bars noted as dowels supplied for this structure shall be deformed reinforcement unless otherwise noted or shown.

The floor slab as shown includes 3/4-inch integral wearing surface.

All laps and development lengths are conservatively based on epoxy coated reinforcement regardless of reinforcement type.

The abutment design utilized on these bridges restricts their use in the following manner:

(1) These bridges are not to be used when point bearing for the abutment steel piling would be obtained on rock at a distance less than 27 ft. from the bottom of the abutment footing without any prebore and at a distance of less than 34 ft. from the bottom of the abutment footing when there is 10 ft. of prebore. A special analysis is required to use steel piling at the abutment, if point bearing occurs at a shallower depth.

(2) For the 140 ft. and 150 ft. long bridges the abutment piling are to be driven through oversized holes prebored to a minimum of 10 ft. below the bottom of footing. The prebored holes shall be in accordance with Section 2501.03,Q of the Standard Specifications. The elevation of the bottom of the prebored hole shall be shown on the plans.

The piers and abutments for these standards have been designed for the use of both friction and point bearing piles. It is necessary that the type and length for both the abutment and pier piles be designated on the front sheet of the plans.

The integral abutments and pile bents for these J40 Standards have been designed for the use of various types of pile footings as follows.

◦ Integral abutments: Timber piles or HP 10x42 piles at Bridge Design Manual (BDM) Article 6.2.6.1 Structural Resistance Level-1 (SRL-1)

◦ Pile Bents: Standard concrete-filled steel pipe piles (P10L), Standard prestressed concrete piles (P10L), or Standard H-piles (P10L and SRL-1)

For pile foundations the Designer will need to determine the construction control method, contract length, and driving target and give that information on the front sheet of the plans. Bridge Design Manual CADD notes E718, E719, E818, and E819 are appropriate for that purpose. The notes, as well as the Bridge Design Manual and design examples, are available on the Bridges and Structures Bureau web site.

For more information on SRL-1, see the Bridge Design Manual, located on the Iowa Department of Transportation, Bridges and Structures Bureau web site. For piers subject to scour the design bearing shall be obtained below scour elevation. Scour elevation shall be shown on the front sheet.

Keyway dimensions shown on the plans are based on nominal dimensions unless stated otherwise. In addition, the bevel used on the keyway shall be limited to a maximum of 10 degrees from vertical.

These bridge plans label all reinforcing steel with english notation (5a1 is 5/8 inch diameter bar). English reinforcing steel received in the field may display the following "Bar Designation". The "Bar Designation" is the stamped impression on the reinforcing bars, and is equivalent to the bar diameter in millimeters.

English Size	3	4	5	6	7	8	9	10	11
Bar Designation	10	13	16	19	22	25	29	32	36

Specifications:

Design: AASHTO LRFD Bridge Design Specifications, 10th Ed., Series of 2024.
 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 shall apply to construction work on this project.

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 10th Ed., Series of 2024.

Reinforcing steel in accordance with LRFD AASHTO Section 5, Grade 60, for epoxy and non-coated bars, and Grade 60 or 75 for stainless steel reinforcing

Concrete in accordance with LRFD AASHTO Section 5, f'c = 4,000 psi,
 Structural steel in accordance with LRFD AASHTO Section 6. ASTM A709 Grade 36 or Grade 50 (AASHTO M270 Grade 36 or Grade 50),

n = 8 for tension steel

2n = 16 for compression steel

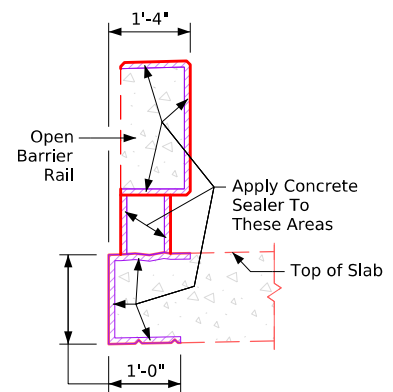
HL-93 live load plus 20 lbs. per sq. ft. for future wearing surface.

End span length is used to calculate equivalent width in live load distribution.

Six foot of approach slab dead & live load included in abutment loads.

Control of cracking by distribution of reinforcement for slab design based on the AASHTO LRFD Bridge Design Specifications, 10th Ed., Series of 2024.

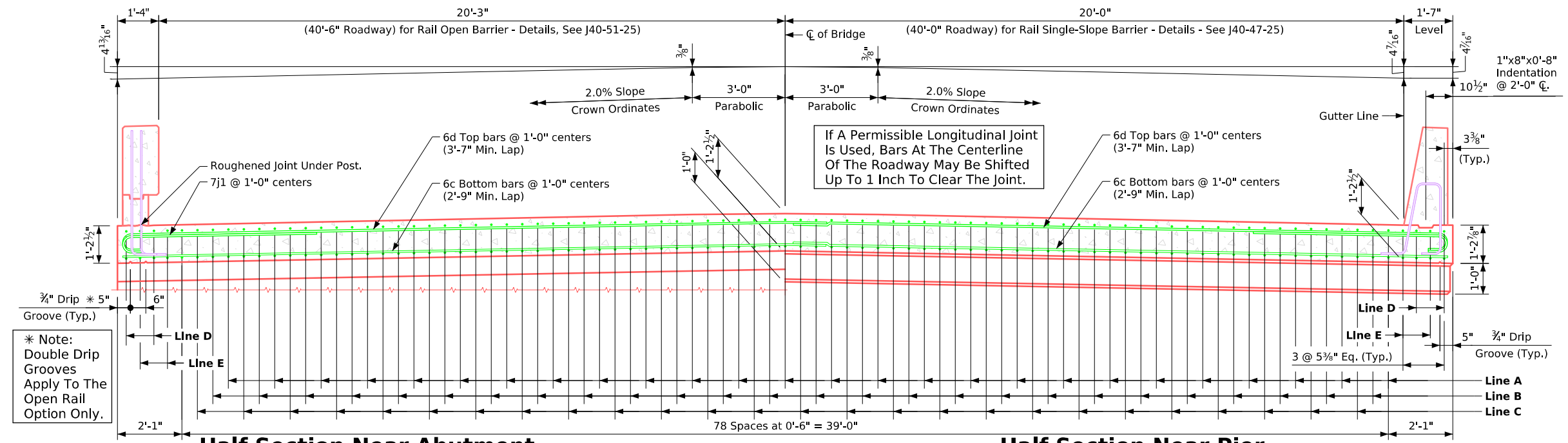
Latest Revision Date Approved by Bridge Engineer	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge
	Continuous Concrete Slab Bridge
July, 2025	
General Information, Notes & Sheet Index	J40-01-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications and Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

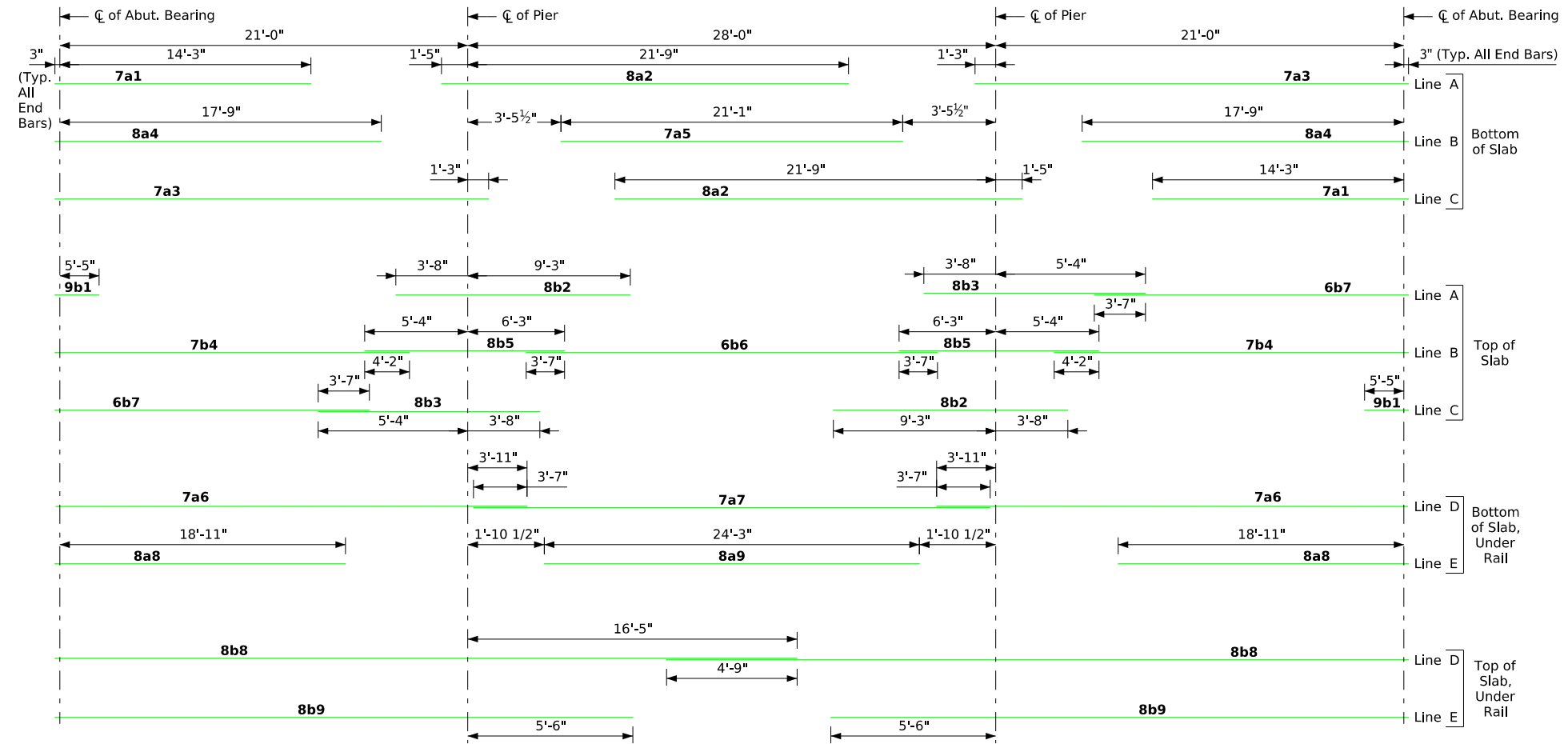
Slab Cross-Section Area For Open Rail = 52.16 sq. ft.

Note: Top longitudinal reinforcing steel shall be parallel to and 2 3/4 inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and 1 1/2 inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.

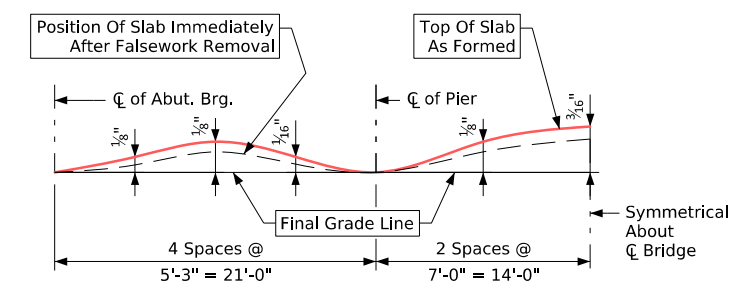
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 52.21 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.



70' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Superstructure Details 70'-0" Bridge		J40-02-25

Epoxy Steel Reinforcing for Superstructure-70' Bridge

Location	Degree Skew		0				15				30				45			
	Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	
Slab Longitudinal Bottom	7a1	53	14'-6"	1571	53	14'-6"	1571	53	14'-6"	1571	53	14'-6"	1571	53	14'-6"	1571		
Slab Longitudinal Bottom	8a2	53	23'-2"	3279	53	23'-2"	3279	53	23'-2"	3279	53	23'-2"	3279	53	23'-2"	3279		
Slab Longitudinal Bottom	7a3	53	22'-6"	2438	53	22'-6"	2438	53	22'-6"	2438	53	22'-6"	2438	53	22'-6"	2438		
Slab Longitudinal Bottom	8a4	52	18'-0"	2500	52	18'-0"	2500	52	18'-0"	2500	52	18'-0"	2500	52	18'-0"	2500		
Slab Longitudinal Bottom	7a5	26	21'-1"	1121	26	21'-1"	1121	26	21'-1"	1121	26	21'-1"	1121	26	21'-1"	1121		
Slab Longitudinal Bottom, at Rail	7a6	8	25'-2"	412	8	25'-2"	412	8	25'-2"	412	8	25'-2"	412	8	25'-2"	412		
Slab Longitudinal Bottom, at Rail	7a7	4	27'-4"	224	4	27'-4"	224	4	27'-4"	224	4	27'-4"	224	4	27'-4"	224		
Slab Longitudinal Bottom, at Rail	8a8	8	19'-2"	410	8	19'-2"	410	8	19'-2"	410	8	19'-2"	410	8	19'-2"	410		
Slab Longitudinal Bottom, at Rail	8a9	4	24'-3"	259	4	24'-3"	259	4	24'-3"	259	4	24'-3"	259	4	24'-3"	259		
Slab Longitudinal Top	9b1	53	7'-11"	1427	53	7'-11"	1427	53	7'-11"	1427	53	7'-11"	1427	53	7'-11"	1427		
Slab Longitudinal Top	8b2	53	12'-11"	1828	53	12'-11"	1828	53	12'-11"	1828	53	12'-11"	1828	53	12'-11"	1828		
Slab Longitudinal Top	8b3	53	9'-0"	1274	53	9'-0"	1274	53	9'-0"	1274	53	9'-0"	1274	53	9'-0"	1274		
Slab Longitudinal Top	7b4	52	22'-4"	2374	52	22'-4"	2374	52	22'-4"	2374	52	22'-4"	2374	52	22'-4"	2374		
Slab Longitudinal Top	8b5	52	11'-7"	1609	52	11'-7"	1609	52	11'-7"	1609	52	11'-7"	1609	52	11'-7"	1609		
Slab Longitudinal Top	6b6	26	22'-8"	886	26	22'-8"	886	26	22'-8"	886	26	22'-8"	886	26	22'-8"	886		
Slab Longitudinal, Top	6b7	53	21'-9"	1732	53	21'-9"	1732	53	21'-9"	1732	53	21'-9"	1732	53	21'-9"	1732		
Slab Longitudinal Top, at Rail	8b8	8	39'-11"	853	8	39'-11"	853	8	39'-11"	853	8	39'-11"	853	8	39'-11"	853		
Slab Longitudinal Top, at Rail	8b9	8	29'-0"	620	8	29'-0"	620	8	29'-0"	620	8	29'-0"	620	8	29'-0"	620		
Slab Transverse Bottom	6c1	67	24'-4"	2449	67	25'-2"	2533	57	24'-4"	2084	47	24'-4"	1718					
Slab Transverse Bottom	6c2	67	21'-3"	2139	67	22'-0"	2214	59	21'-3"	1884	51	21'-3"	1628					
Slab Transverse Ends, Bottom	6c3	-	-	-	-	-	-	-	13	VARIABLES	262	21	VARIABLES	447				
Slab Transverse Ends, Bottom	6c4	-	-	-	-	-	-	-	11	VARIABLES	235	20	VARIABLES	386				
Slab Transverse Ends, Bottom	6c5	-	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298				
Slab Transverse Ends, Bottom	6c6	-	-	-	-	-	-	-	11	VARIABLES	191	17	VARIABLES	311				
Slab Transverse Top	6d1	67	25'-10"	2600	67	26'-8"	2684	57	25'-10"	2212	47	25'-10"	1824					
Slab Transverse Top	6d2	67	21'-11"	2206	67	22'-8"	2282	59	21'-11"	1943	51	21'-11"	1679					
Slab Transverse Ends, Top	6d3	-	-	-	-	-	-	-	13	VARIABLES	271	20	VARIABLES	466				
Slab Transverse Ends, Top	6d4	-	-	-	-	-	-	-	11	VARIABLES	247	20	VARIABLES	411				
Slab Transverse Ends, Top	6d5	-	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298				
Slab Transverse Ends, Top	6d6	-	-	-	-	-	-	-	11	VARIABLES	202	17	VARIABLES	328				
Slab, Transverse at Abutment	8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667					
Slab, Transverse at Abutment	8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422					
Slab, Hairpins, at Abutment	6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841					
Slab, Diagonal, at Abutment	6e4	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818					
Top of Slab, Transverse, at Rail	7j1	132	8'-3"	2226	132	8'-3"	2226	132	8'-3"	2226	130	8'-3"	2193					
Wing, Vertical	5m1	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185					
Wing, Horizontal Back Face	5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334					
Epoxy Reinforcing Total Weight (lbs)				40,757			41,156			41,598			42,071					
Rail Single-Slope Barrier - Quantities - See Sheet J40-48-25.				3406			3406			3406			3406					
Rail Open Barrier - Quantities - See Sheet J40-52-25.				4066			4066			4066			4066					
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail				44,163			44,562			45,004			45,477					
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail				44,823			45,222			45,664			46,137					
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail				44,163			44,562			45,004			45,477					
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail				44,823			45,222			45,664			46,137					
Stainless Steel Rail Total-Ibs. Single-Slope Rail				1665			1665			1665			1665					
Stainless Steel Rail Total-Ibs. Open Rail				1572			1572			1572			1572					

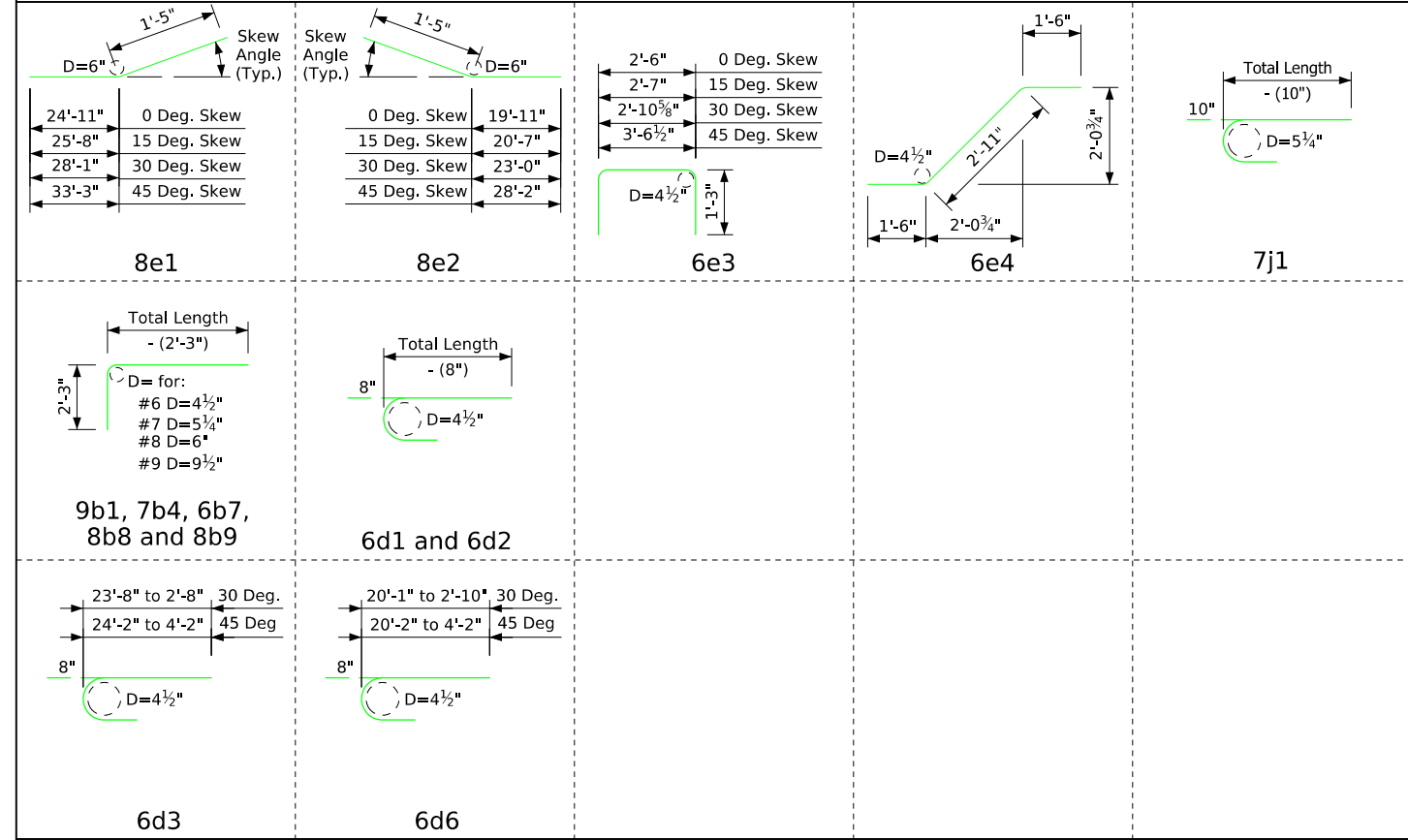
Estimated Quantities for Superstructure 70' Bridge

Item	Monolithic Cap				Non-Monolithic Cap			
	0°	15°	30°	45°	0°	15°	30°	45°
With Single-Slope Rail								
* Structural Concrete (Bridge) (c.y.)	160.4	161.2	163.6	169.0	163.8	164.6	167.5	173.6
Reinf. Steel Epoxy Coated (lbs.)	44,163	44,562	45,004	45,477	44,163	44,562	45,004	45,477
Δ Reinf. Steel Stainless Steel (lbs.)	1888	1888	1888	1888	1888	1888	1888	1888
Concrete single-slope barrier or open rail (lin.ft.)	162.0	162.2	162.9	164.5	162.0	162.2	162.9	164.5
With Open Rail								
* Structural Concrete (Bridge) (c.y.)	160.3	161.1	163.4	168.9	163.6	164.5	167.3	173.5
Reinf. Steel Epoxy Coated (lbs.)	44,823	45,222	45,664	46,137	44,823	45,222	45,664	46,137
Δ Reinf. Steel Stainless Steel (lbs.)	1795	1795	1795	1795	1795	1795	1795	1795

* Includes 4 wings at 1.114 cubic yard each; excludes rail concrete.

Δ Includes abutment paving notch bar weight.

70'-0 Bridge-Bent Bar Details



Note: All Dimensions Are Out To Out. D=pin Diameter.

Stainless Steel Reinforcing for Superstructure

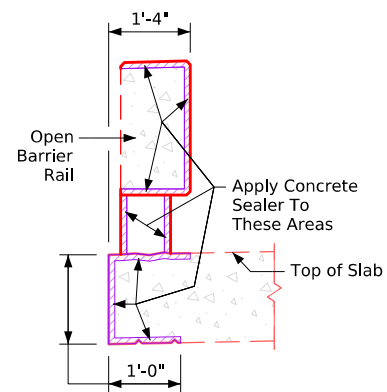
(All Skews)					
Location	Shape	Bar	No.	Length	Weight
Abutment Paving Notch Bar		8u1	40	2'-1"	223

Weight = lbs.

8u1 bars are to be paid for under the price bid for "Reinforcing Steel, Stainless Steel".

Note:
See J40-26-25 Sheet for Monolithic Pier Cap reinforcing details and quantities.
See J40-28-25 Sheet for Non-Monolithic Pier Cap reinforcing details and quantities.

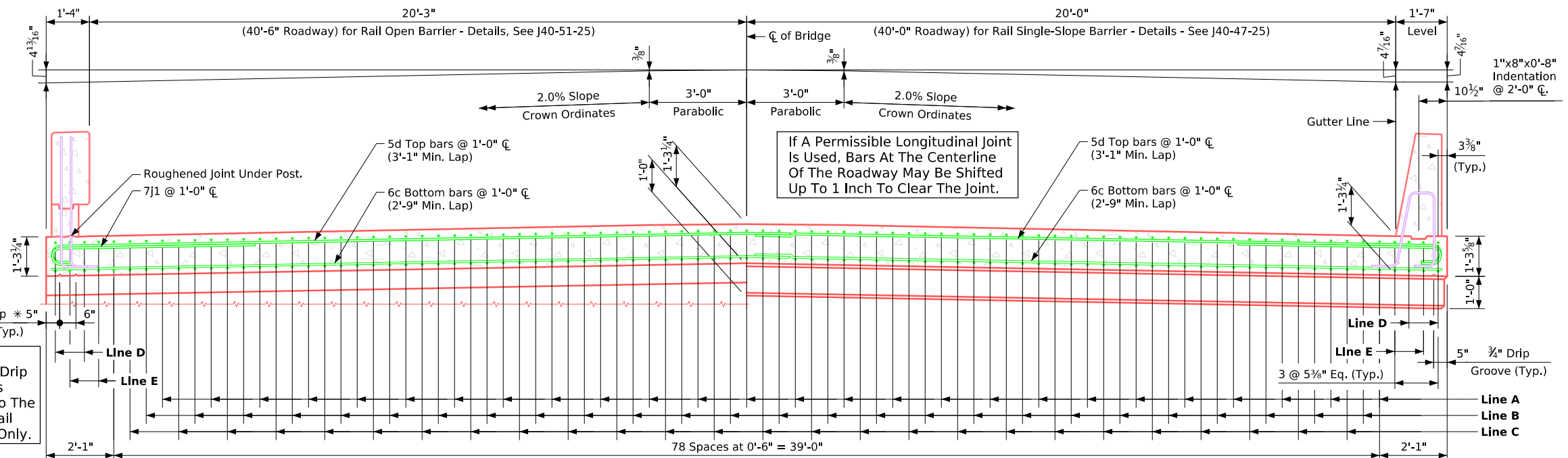
Latest Revision Date Approved by Bridge Engineer	<h1 style="margin: 0;">IOWA DOT</h1>
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2 style="margin: 0;">Continuous Concrete Slab Bridge</h2>
	July, 2025 Superstructure Details 70'-0" Bridge Quantities
<h3 style="margin: 0;">J40-03-25</h3>	



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications** and **Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

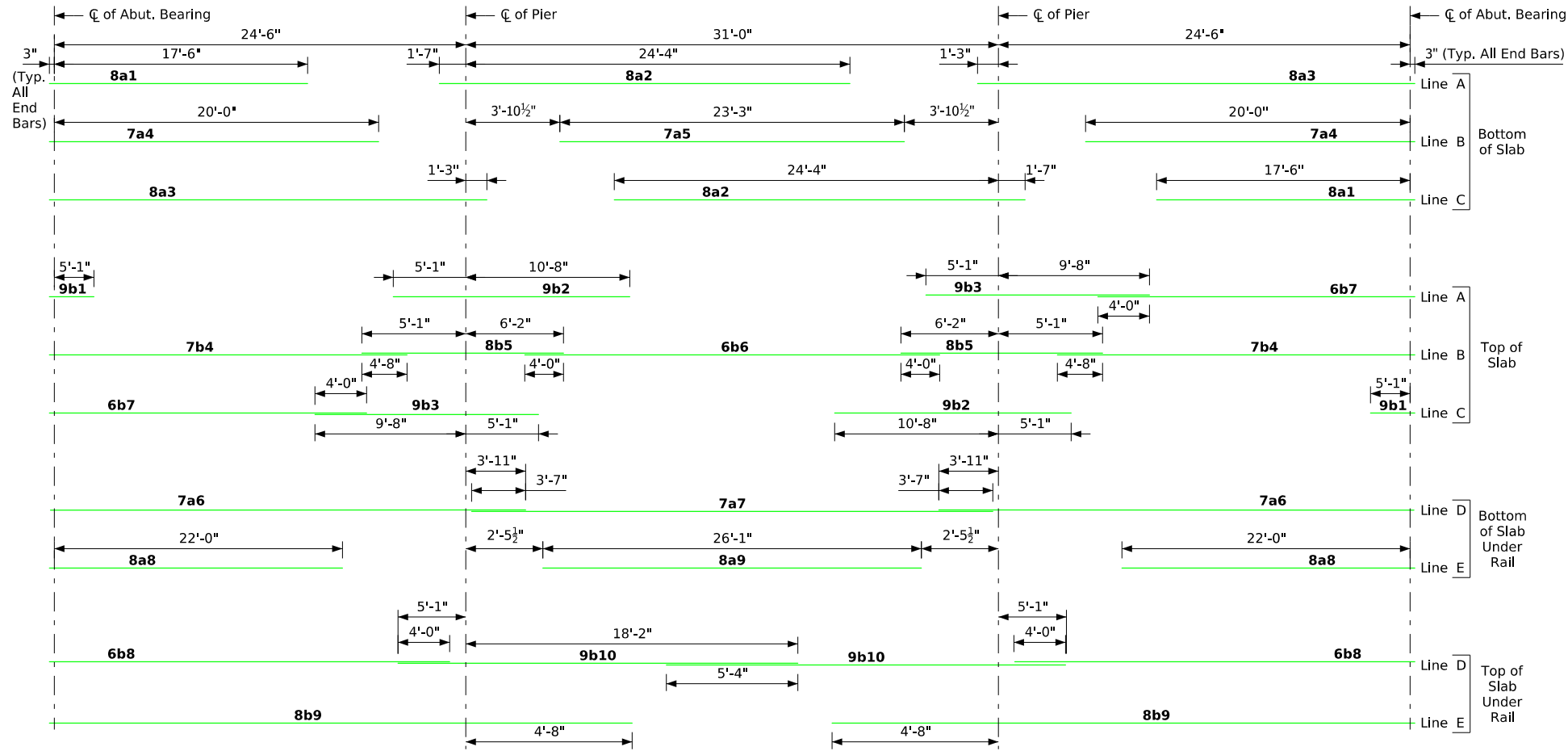
Half Section Near Pier

Slab Cross-Section Area For Open Rail = 54.86 sq. ft.

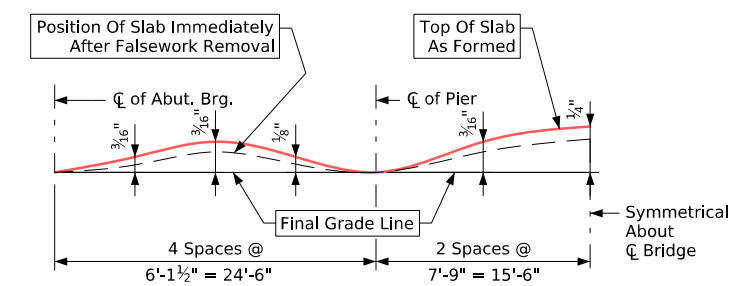
Slab Cross-Section Area For Single-Slope Barrier Rail = 54.91 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.

Note: Top longitudinal reinforcing steel shall be parallel to and $2\frac{3}{4}$ inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and $1\frac{1}{2}$ inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.



80' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

Latest Revision Date Approved by Bridge Engineer 	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025
	Superstructure Details 80'-0" Bridge
J40-04-25	

Epoxy Steel Reinforcing for Superstructure-80' Bridge

Location	Degree Skew		0				15				30				45			
	Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	
Slab Longitudinal Bottom	8a1	53	17'-9"	2512	53	17'-9"	2512	53	17'-9"	2512	53	17'-9"	2512	53	17'-9"	2512		
Slab Longitudinal Bottom	8a2	53	25'-11"	3668	53	25'-11"	3668	53	25'-11"	3668	53	25'-11"	3668	53	25'-11"	3668		
Slab Longitudinal Bottom	8a3	53	26'-0"	3680	53	26'-0"	3680	53	26'-0"	3680	53	26'-0"	3680	53	26'-0"	3680		
Slab Longitudinal Bottom	7a4	52	20'-3"	2153	52	20'-3"	2153	52	20'-3"	2153	52	20'-3"	2153	52	20'-3"	2153		
Slab Longitudinal Bottom	7a5	26	23'-3"	1236	26	23'-3"	1236	26	23'-3"	1236	26	23'-3"	1236	26	23'-3"	1236		
Slab Longitudinal Bottom, at Rail	7a6	8	28'-8"	469	8	28'-8"	469	8	28'-8"	469	8	28'-8"	469	8	28'-8"	469		
Slab Longitudinal Bottom, at Rail	7a7	4	30'-4"	249	4	30'-4"	249	4	30'-4"	249	4	30'-4"	249	4	30'-4"	249		
Slab Longitudinal Bottom, at Rail	8a8	8	22'-3"	476	8	22'-3"	476	8	22'-3"	476	8	22'-3"	476	8	22'-3"	476		
Slab Longitudinal Bottom, at Rail	8a9	4	26'-1"	279	4	26'-1"	279	4	26'-1"	279	4	26'-1"	279	4	26'-1"	279		
Slab Longitudinal Top	9b1	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367		
Slab Longitudinal Top	9b2	53	15'-9"	2839	53	15'-9"	2839	53	15'-9"	2839	53	15'-9"	2839	53	15'-9"	2839		
Slab Longitudinal Top	9b3	53	14'-9"	2658	53	14'-9"	2658	53	14'-9"	2658	53	14'-9"	2658	53	14'-9"	2658		
Slab Longitudinal Top	7b4	52	26'-7"	2826	52	26'-7"	2826	52	26'-7"	2826	52	26'-7"	2826	52	26'-7"	2826		
Slab Longitudinal Top	8b5	52	11'-3"	1562	52	11'-3"	1562	52	11'-3"	1562	52	11'-3"	1562	52	11'-3"	1562		
Slab Longitudinal Top	6b6	26	26'-8"	1042	26	26'-8"	1042	26	26'-8"	1042	26	26'-8"	1042	26	26'-8"	1042		
Slab Longitudinal, Top	6b7	53	21'-4"	1699	53	21'-4"	1699	53	21'-4"	1699	53	21'-4"	1699	53	21'-4"	1699		
Slab Longitudinal Top, at Rail	6b8	8	25'-11"	312	8	25'-11"	312	8	25'-11"	312	8	25'-11"	312	8	25'-11"	312		
Slab Longitudinal Top, at Rail	8b9	8	31'-8"	677	8	31'-8"	677	8	31'-8"	677	8	31'-8"	677	8	31'-8"	677		
Slab Longitudinal Top, at Rail	9b10	8	23'-3"	633	8	23'-3"	633	8	23'-3"	633	8	23'-3"	633	8	23'-3"	633		
Slab Transverse Bottom	6c1	77	24'-4"	2815	77	25'-2"	2911	67	24'-4"	2449	57	24'-4"	2084					
Slab Transverse Bottom	6c2	77	21'-3"	2458	77	22'-0"	2545	69	21'-3"	2203	61	21'-3"	1947					
Slab Transverse Ends, Bottom	6c3	-	-	-	-	-	-	13	VARIABLES	262	21	VARIABLES	447					
Slab Transverse Ends, Bottom	6c4	-	-	-	-	-	-	11	VARIABLES	233	20	VARIABLES	386					
Slab Transverse Ends, Bottom	6c5	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298					
Slab Transverse Ends, Bottom	6c6	-	-	-	-	-	-	11	VARIABLES	191	17	VARIABLES	311					
Slab Transverse Top	5d1	77	25'-3"	2028	77	26'-1"	2095	67	25'-3"	1765	57	25'-3"	1502					
Slab Transverse Top	5d2	77	21'-10"	1754	77	22'-7"	1814	69	21'-10"	1572	61	21'-10"	1390					
Slab Transverse Ends, Top	5d3	-	-	-	-	-	-	13	VARIABLES	188	21	VARIABLES	324					
Slab Transverse Ends, Top	5d4	-	-	-	-	-	-	11	VARIABLES	166	20	VARIABLES	275					
Slab Transverse Ends, Top	5d5	-	-	-	-	-	-	10	VARIABLES	120	17	VARIABLES	207					
Slab Transverse Ends, Top	5d6	-	-	-	-	-	-	11	VARIABLES	139	17	VARIABLES	227					
Slab, Transverse at Abutment	8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667					
Slab, Transverse at Abutment	8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422					
Slab, Transverse at Abutment	6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841					
Slab, Transverse at Abutment	6e4	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818					
Top of Slab, Transverse, at Rail	7j1	152	8'-3"	2564	152	8'-3"	2564	142	8'-3"	2395	136	8'-3"	2294					
Wing, Vertical	5m1	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185					
Wing, Horizontal Back Face	5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334					
Epoxy Reinforcing Total Weight (lbs)				46,276			46,666			46,871			47,296					
Rail Single-Slope Barrier - Quantities - See Sheet J40-48-25.				3798			3798			3798			3798					
Rail Open Barrier - Quantities - See Sheet J40-52-25.				4427			4427			4427			4427					
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail				50,074			50,464			50,669			51,094					
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail				50,703			51,093			51,298			51,723					
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail				50,074			50,464			50,669			51,094					
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail				50,703			51,093			51,298			51,723					
Stainless Steel Rail Total-Ibs. Single-Slope Rail				1826			1826			1826			1826					
Stainless Steel Rail Total-Ibs. Open Rail				1717			1717			1717			1717					

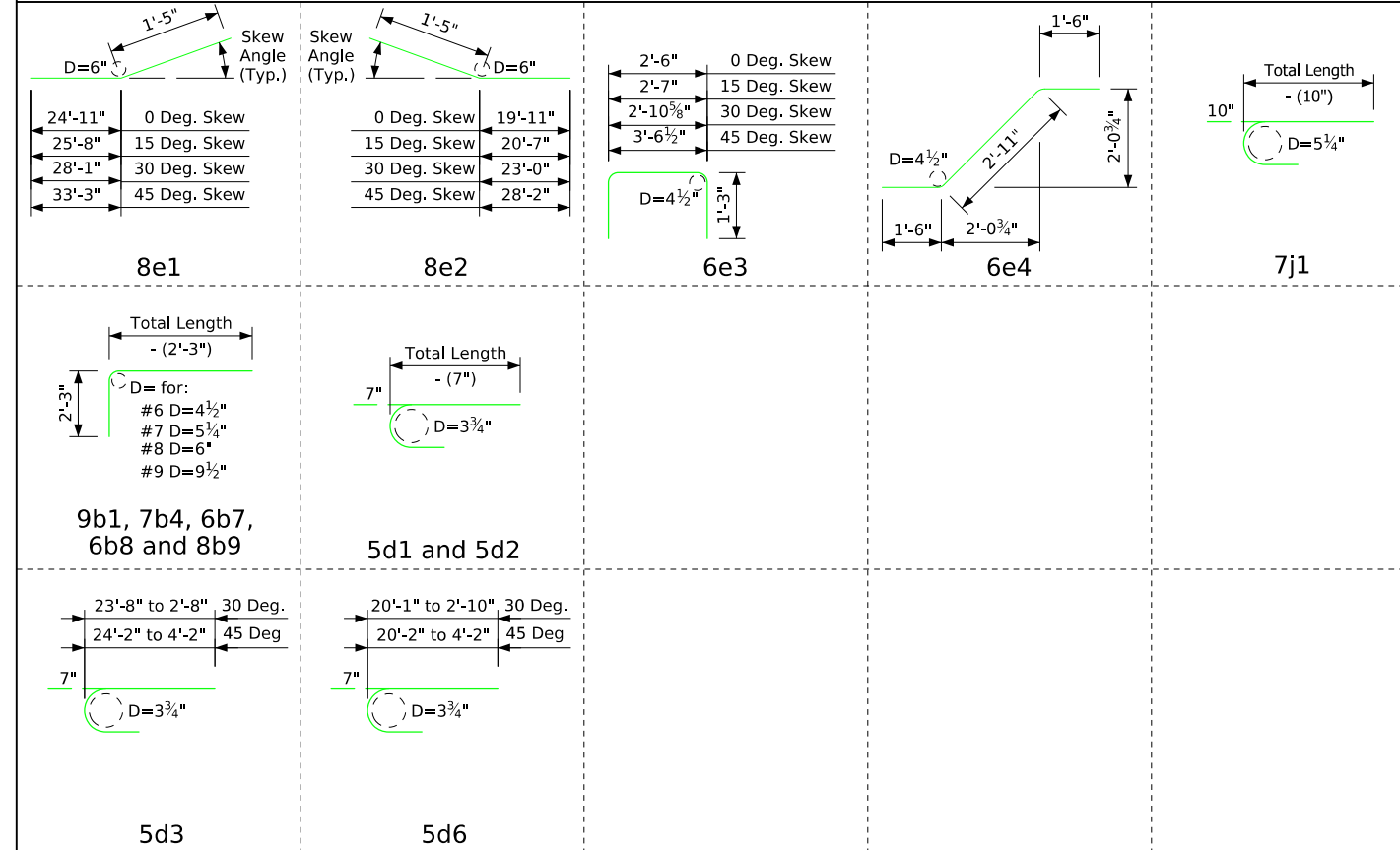
Estimated Quantities for Superstructure 80' Bridge

Item	Monolithic Cap				Non-Monolithic Cap			
	0°	15°	30°	45°	0°	15°	30°	45°
With Single-Slope Rail								
* Structural Concrete (Bridge) (c.y.)	187.4	188.3	190.5	195.9	190.8	191.6	196.1	200.5
Reinf. Steel Epoxy Coated (lbs.)	50,074	50,464	50,669	51,094	50,074	50,464	50,669	51,094
Δ Reinf. Steel Stainless Steel (lbs.)	2049	2049	2049	2049	2049	2049	2049	2049
Concrete single-slope barrier or open rail (lin.ft.)	182	182.2	182.9	184.5	182	182.2	182.9	184.5
With Open Rail								
* Structural Concrete (Bridge) (c.y.)	187.3	188.1	190.4	195.8	190.6	191.5	194.3	200.4
Reinf. Steel Epoxy Coated (lbs.)	50,703	51,093	51,298	51,723	50,703	51,093	51,298	51,723
Δ Reinf. Steel Stainless Steel (lbs.)	1940	1940	1940	1940	1940	1940	1940	1940

* Includes 4 wings at 1.114 cubic yard each; excludes rail concrete.

Δ Includes abutment paving notch bar weight.

80'-0 Bridge-Bent Bar Details



Stainless Steel Reinforcing for Superstructure

(All Skews)					
Location	Shape	Bar	No.	Length	Weight
Abutment Paving Notch Bar		8u1	40	2'-1	223

Weight = lbs.

8u1 bars are to be paid for under the price bid for "Reinforcing Steel, Stainless Steel".

Note:
See J40-26-25 Sheet for Monolithic Pier Cap reinforcing details and quantities.
See J40-28-25 Sheet for Non-Monolithic Pier Cap reinforcing details and quantities.

Latest Revision Date Approved by Bridge Engineer	<h1 style="margin: 0;">IOWA DOT</h1>
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2 style="margin: 0;">Continuous Concrete Slab Bridge</h2>
	July, 2025 Superstructure Details 80'-0" Bridge Quantities
<h2 style="margin: 0;">J40-05-25</h2>	

Epoxy Steel Reinforcing for Superstructure-90' Bridge

Location	Degree Skew	0				15				30				45			
		Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length
Slab Longitudinal Bottom		8a1	53	19'-4"	2736	53	19'-4"	2736	53	19'-4"	2736	53	19'-4"	2736			
Slab Longitudinal Bottom		8a2	53	28'-8"	4057	53	28'-8"	4057	53	28'-8"	4057	53	28'-8"	4057			
Slab Longitudinal Bottom		8a3	53	29'-2"	4128	53	29'-2"	4128	53	29'-2"	4128	53	29'-2"	4128			
Slab Longitudinal Bottom		8a4	52	22'-9"	3159	52	22'-9"	3159	52	22'-9"	3159	52	22'-9"	3159			
Slab Longitudinal Bottom		8a5	26	26'-2"	1817	26	26'-2"	1817	26	26'-2"	1817	26	26'-2"	1817			
Slab Longitudinal Bottom, at Rail		8a6	8	32'-9"	700	8	32'-9"	700	8	32'-9"	700	8	32'-9"	700			
Slab Longitudinal Bottom, at Rail		8a7	4	34'-0"	364	4	34'-0"	364	4	34'-0"	364	4	34'-0"	364			
Slab Longitudinal Bottom, at Rail		8a8	8	23'-3"	497	8	23'-3"	497	8	23'-3"	497	8	23'-3"	497			
Slab Longitudinal Bottom, at Rail		8a9	4	25'-11"	277	4	25'-11"	277	4	25'-11"	277	4	25'-11"	277			
Slab Longitudinal Top		9b1	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367			
Slab Longitudinal Top		9b2	53	16'-10"	3034	53	16'-10"	3034	53	16'-10"	3034	53	16'-10"	3034			
Slab Longitudinal Top		9b3	53	17'-3"	3109	53	17'-3"	3109	53	17'-3"	3109	53	17'-3"	3109			
Slab Longitudinal Top		6b4	52	27'-5"	2142	52	27'-5"	2142	52	27'-5"	2142	52	27'-5"	2142			
Slab Longitudinal Top		9b5	52	13'-7"	2402	52	13'-7"	2402	52	13'-7"	2402	52	13'-7"	2402			
Slab Longitudinal Top		6b6	26	29'-0"	1133	26	29'-0"	1133	26	29'-0"	1133	26	29'-0"	1133			
Slab Longitudinal Top		6b7	53	21'-10"	1739	53	21'-10"	1739	53	21'-10"	1739	53	21'-10"	1739			
Slab Longitudinal Top, at Rail		6b8	8	28'-5"	342	8	28'-5"	342	8	28'-5"	342	8	28'-5"	342			
Slab Longitudinal Top, at Rail		6b9	8	29'-11"	360	8	29'-11"	360	8	29'-11"	360	8	29'-11"	360			
Slab Longitudinal Top, at Rail		6b10	4	25'-10"	156	4	25'-10"	156	4	25'-10"	156	4	25'-10"	156			
Slab Longitudinal Top, at Rail		9b11	8	14'-2"	386	8	14'-2"	386	8	14'-2"	386	8	14'-2"	386			
Slab Longitudinal Top, at Rail		8b12	8	8'-9"	187	8	8'-9"	187	8	8'-9"	187	8	8'-9"	187			
Slab Transverse Bottom		6c1	87	24'-4"	3180	87	25'-2"	3289	77	24'-4"	2815	67	24'-4"	2449			
Slab Transverse Bottom		6c2	87	21'-3"	2777	87	22'-0"	2875	79	21'-3"	2522	71	21'-3"	2267			
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	13	VARIABLES	262	21	VARIABLES	447			
Slab Transverse Ends, Bottom		6c4	-	-	-	-	-	-	11	VARIABLES	233	20	VARIABLES	386			
Slab Transverse Ends, Bottom		6c5	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298			
Slab Transverse Ends, Bottom		6c6	-	-	-	-	-	-	11	VARIABLES	191	17	VARIABLES	311			
Slab Transverse Top		5d1	87	25'-3"	2292	87	26'-1"	2367	77	25'-3"	2028	67	25'-3"	1765			
Slab Transverse Top		5d2	87	21'-10"	1982	87	22'-7"	2050	79	21'-10"	1800	71	21'-10"	1617			
Slab Transverse Ends, Top		5d3	-	-	-	-	-	-	13	VARIABLES	188	21	VARIABLES	324			
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	11	VARIABLES	166	20	VARIABLES	275			
Slab Transverse Ends, Top		5d5	-	-	-	-	-	-	10	VARIABLES	120	17	VARIABLES	207			
Slab Transverse Ends, Top		5d6	-	-	-	-	-	-	11	VARIABLES	139	17	VARIABLES	227			
Slab, Transverse at Abutment		8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667			
Slab, Transverse at Abutment		8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422			
Slab, Transverse at Abutment		6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841			
Slab, Transverse at Abutment		6e4	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818			
Top of Slab, Transverse, at Rail		7j1	172	8'-3"	2901	172	8'-3"	2901	162	8'-3"	2732	156	8'-3"	2631			
Wing, Vertical		5m1	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185			
Wing, Horizontal Back Face		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334			
Epoxy Reinforcing Total Weight (lbs)					51,544			51,974			52,139			52,563			
Rail Single-Slope Barrier - Quantities - See Sheet J40-48-25.					4134			4134			4134			4134			
Rail Open Barrier - Quantities - See Sheet J40-52-25.					4789			4789			4789			4789			
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail					55,678			56,108			56,273			56,697			
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail					56,333			56,763			56,928			57,352			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail					55,678			56,108			56,273			56,697			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail					56,333			56,763			56,928			57,352			
Stainless Steel Rail Total-Ibs. Single-Slope Rail					2020			2020			2020			2020			
Stainless Steel Rail Total-Ibs. Open Rail					1867			1867			1867			1867			

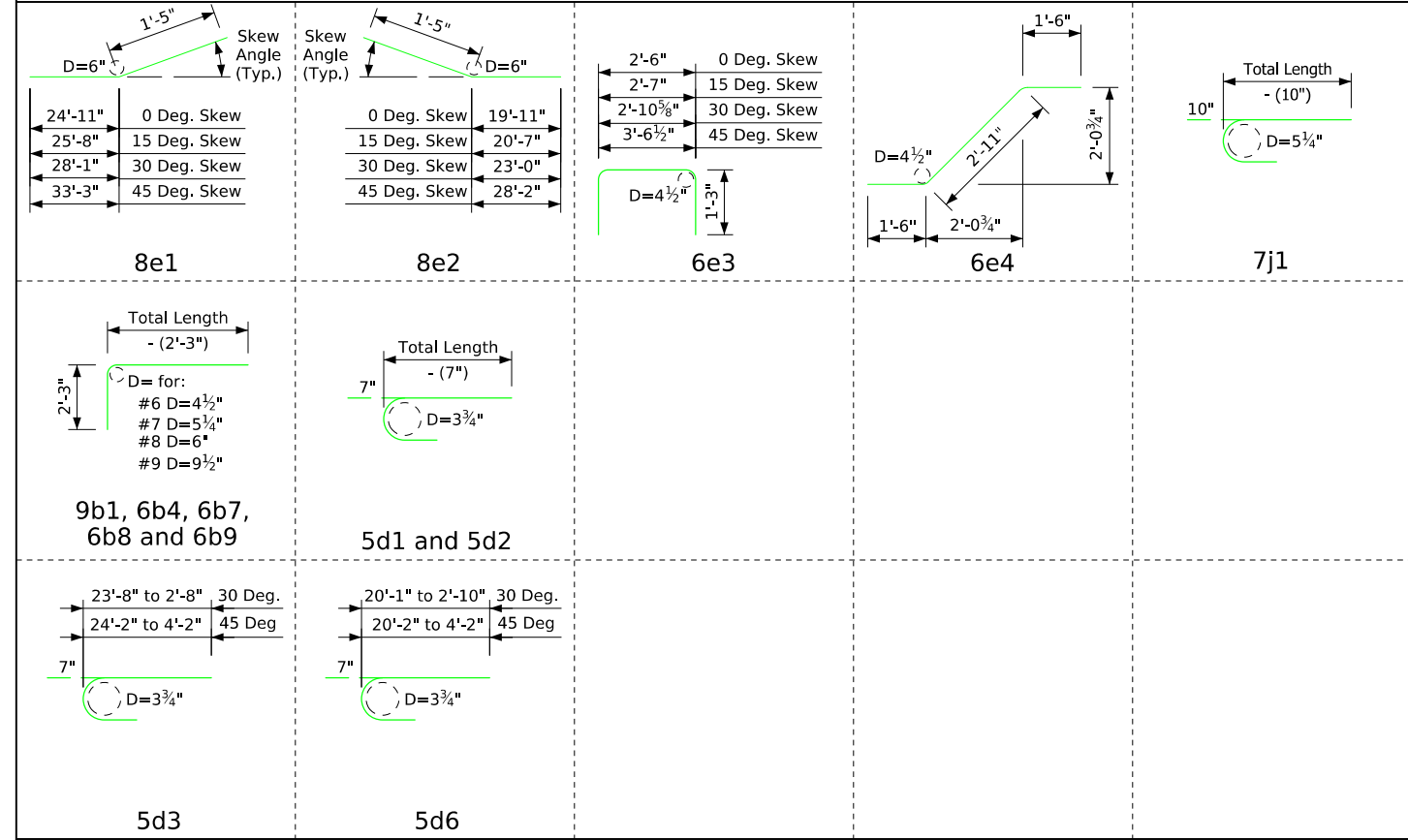
Estimated Quantities for Superstructure 90' Bridge

Item	Monolithic Cap				Non-Monolithic Cap			
	0°	15°	30°	45°	0°	15°	30°	45°
With Single-Slope Rail								
* Structural Concrete (Bridge) (c.y.)	219.4	220.2	222.4	227.7	222.7	223.5	226.3	232.3
Reinf. Steel Epoxy Coated (lbs.)	55,678	56,108	56,273	56,697	55,678	56,108	56,273	56,697
Δ Reinf. Steel Stainless Steel (lbs.)	2243	2243	2243	2243	2243	2243	2243	2243
Concrete single-slope barrier or open rail (lin.ft.)	202	202.2	202.9	204.5	202	202.2	202.9	204.5
With Open Rail								
* Structural Concrete (Bridge) (c.y.)	219.3	220.1	222.3	227.6	222.5	223.4	226.1	232.1
Reinf. Steel Epoxy Coated (lbs.)	56,333	56,763	56,928	57,352	56,333	56,763	56,928	57,352
Δ Reinf. Steel Stainless Steel (lbs.)	2090	2090	2090	2090	2090	2090	2090	2090

* Includes 4 wings at 1.114 cubic yard each; excludes rail concrete.

Δ Includes abutment paving notch bar weight.

90'-0 Bridge-Bent Bar Details



Stainless Steel Reinforcing for Superstructure

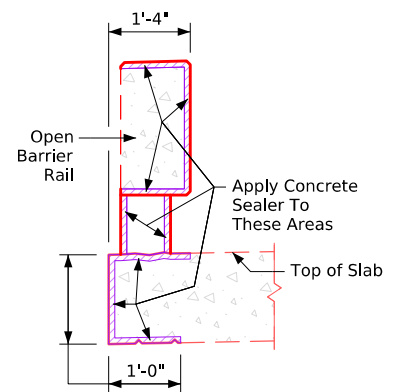
(All Skews)					
Location	Shape	Bar	No.	Length	Weight
Abutment Paving Notch Bar		8u1	40	2'-1	223

Weight = lbs.

Note:
See J40-26-25 Sheet for Monolithic Pier Cap reinforcing details and quantities.
See J40-28-25 Sheet for Non-Monolithic Pier Cap reinforcing details and quantities.

Latest Revision Date Approved by Bridge Engineer	<h1 style="margin: 0;">IOWA DOT</h1>
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2 style="margin: 0;">Continuous Concrete Slab Bridge</h2>
	July, 2025 Superstructure Details 90'-0" Bridge Quantities

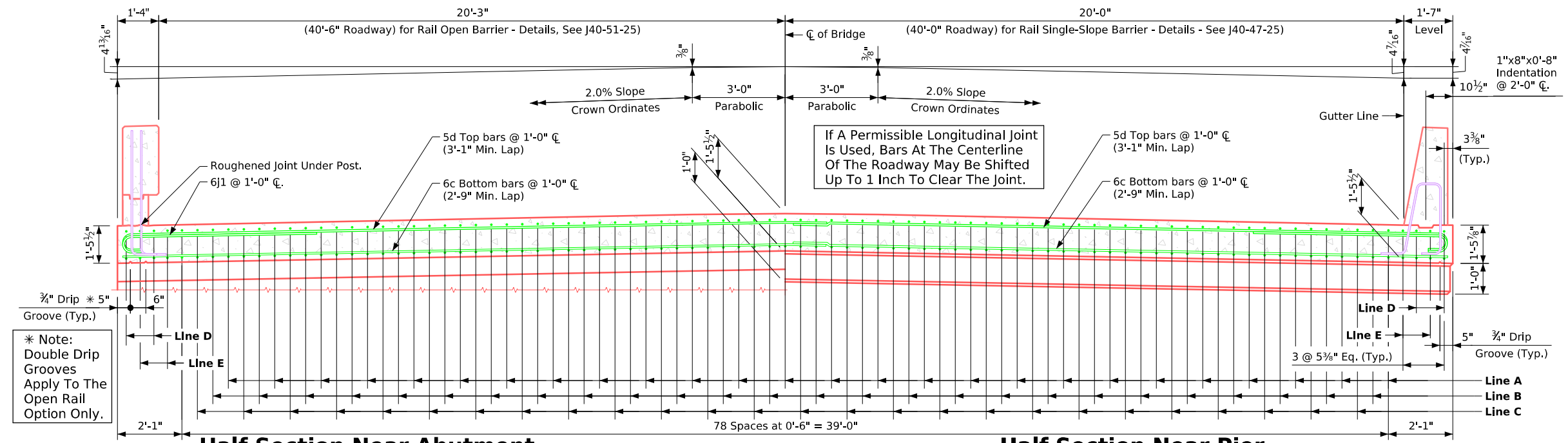
J40-07-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications** and **Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

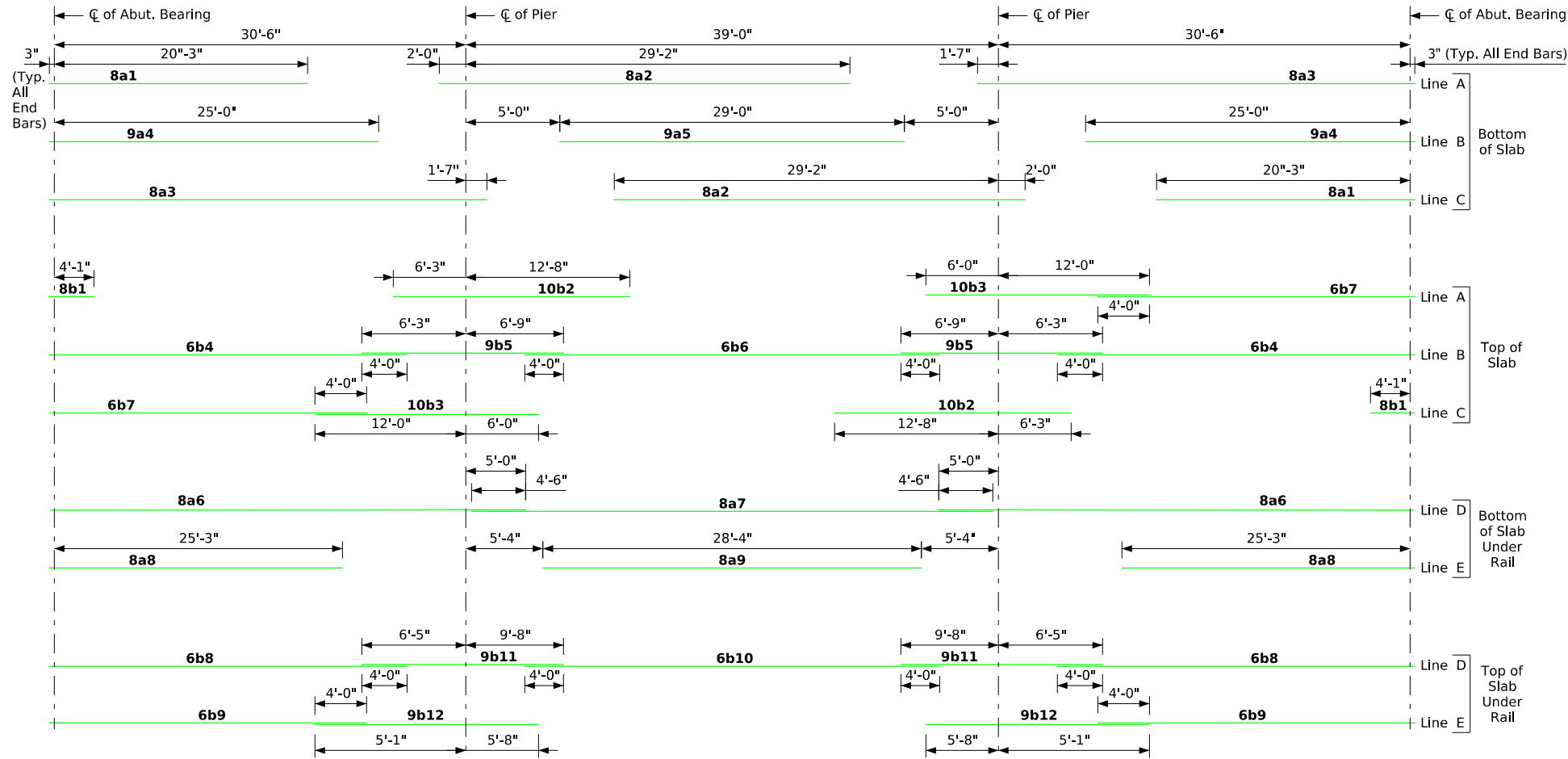
Slab Cross-Section Area For Open Rail = 62.95 sq. ft.

Note: Top longitudinal reinforcing steel shall be parallel to and 2 3/4 inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and 1 1/2 inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.

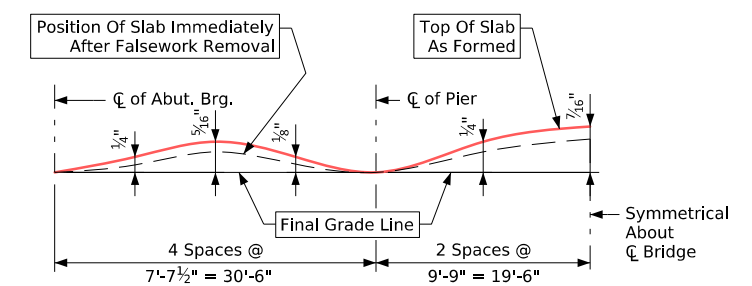
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 63.00 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.



100' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

Latest Revision Date Approved by Bridge Engineer <i>[Signature]</i>	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Superstructure Details 100'-0" Bridge		J40-08-25

Epoxy Steel Reinforcing for Superstructure-100' Bridge

Location	Degree Skew	0				15				30				45			
		Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length
Slab Longitudinal Bottom		8a1	53	20'-6"	2901	53	20'-6"	2901	53	20'-6"	2901	53	20'-6"	2901			
Slab Longitudinal Bottom		8a2	53	31'-2"	4411	53	31'-2"	4411	53	31'-2"	4411	53	31'-2"	4411			
Slab Longitudinal Bottom		8a3	53	32'-4"	4576	53	32'-4"	4576	53	32'-4"	4576	53	32'-4"	4576			
Slab Longitudinal Bottom		9a4	52	25'-3"	4465	52	25'-3"	4465	52	25'-3"	4465	52	25'-3"	4465			
Slab Longitudinal Bottom		9a5	26	29'-0"	2564	26	29'-0"	2564	26	29'-0"	2564	26	29'-0"	2564			
Slab Longitudinal Bottom, at Rail		8a6	8	35'-9"	764	8	35'-9"	764	8	35'-9"	764	8	35'-9"	764			
Slab Longitudinal Bottom, at Rail		8a7	4	38'-0"	406	4	38'-0"	406	4	38'-0"	406	4	38'-0"	406			
Slab Longitudinal Bottom, at Rail		8a8	8	25'-6"	545	8	25'-6"	545	8	25'-6"	545	8	25'-6"	545			
Slab Longitudinal Bottom, at Rail		8a9	4	28'-4"	303	4	28'-4"	303	4	28'-4"	303	4	28'-4"	303			
Slab Longitudinal Top		8b1	53	6'-7"	932	53	6'-7"	932	53	6'-7"	932	53	6'-7"	932			
Slab Longitudinal Top		10b2	53	18'-11"	4315	53	18'-11"	4315	53	18'-11"	4315	53	18'-11"	4315			
Slab Longitudinal Top		10b3	53	18'-0"	4106	53	18'-0"	4106	53	18'-0"	4106	53	18'-0"	4106			
Slab Longitudinal Top		6b4	52	30'-9"	2402	52	30'-9"	2402	52	30'-9"	2402	52	30'-9"	2402			
Slab Longitudinal Top		9b5	52	13'-0"	2299	52	13'-0"	2299	52	13'-0"	2299	52	13'-0"	2299			
Slab Longitudinal Top		6b6	26	33'-6"	1309	26	33'-6"	1309	26	33'-6"	1309	26	33'-6"	1309			
Slab Longitudinal Top		6b7	53	25'-3"	2011	53	25'-3"	2011	53	25'-3"	2011	53	25'-3"	2011			
Slab Longitudinal Top, at Rail		6b8	8	30'-7"	368	8	30'-7"	368	8	30'-7"	368	8	30'-7"	368			
Slab Longitudinal Top, at Rail		6b9	8	31'-11"	384	8	31'-11"	384	8	31'-11"	384	8	31'-11"	384			
Slab Longitudinal Top, at Rail		6b10	4	27'-8"	167	4	27'-8"	167	4	27'-8"	167	4	27'-8"	167			
Slab Longitudinal Top, at Rail		9b11	8	16'-1"	438	8	16'-1"	438	8	16'-1"	438	8	16'-1"	438			
Slab Longitudinal Top, at Rail		9b12	8	10'-9"	293	8	10'-9"	293	8	10'-9"	293	8	10'-9"	293			
Slab Transverse Bottom		6c1	97	24'-4"	3546	97	25'-2"	3667	87	24'-4"	3180	77	24'-4"	2815			
Slab Transverse Bottom		6c2	97	21'-3"	3096	97	22'-0"	3206	89	21'-3"	2841	81	21'-3"	2586			
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	13	VARIABLES	262	21	VARIABLES	447			
Slab Transverse Ends, Bottom		6c4	-	-	-	-	-	-	11	VARIABLES	233	20	VARIABLES	386			
Slab Transverse Ends, Bottom		6c5	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298			
Slab Transverse Ends, Bottom		6c6	-	-	-	-	-	-	11	VARIABLES	191	17	VARIABLES	311			
Slab Transverse Top		5d1	97	25'-3"	2555	97	26'-1"	2639	87	25'-3"	2292	77	25'-3"	2028			
Slab Transverse Top		5d2	97	21'-10"	2209	97	22'-7"	2285	89	21'-10"	2027	81	21'-10"	1845			
Slab Transverse Ends, Top		5d3	-	-	-	-	-	-	13	VARIABLES	188	21	VARIABLES	324			
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	11	VARIABLES	166	20	VARIABLES	275			
Slab Transverse Ends, Top		5d5	-	-	-	-	-	-	10	VARIABLES	120	17	VARIABLES	207			
Slab Transverse Ends, Top		5d6	-	-	-	-	-	-	11	VARIABLES	139	17	VARIABLES	227			
Slab, Transverse at Abutment		8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667			
Slab, Transverse at Abutment		8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422			
Slab, Transverse at Abutment		6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841			
Slab, Transverse at Abutment		6e4	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818			
Top of Slab, Transverse, at Rail		6j1	192	7'-7"	2187	192	7'-7"	2187	182	7'-7"	2074	176	7'-7"	2005			
Wing, Vertical		5m1	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185			
Wing, Horizontal Back Face		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334			
Epoxy Reinforcing Total Weight (lbs)					57,872			58,343			58,523			58,980			
Rail Single-Slope Barrier - Quantities - See Sheet J40-48-25.					4461			4461			4461			4461			
Rail Open Barrier - Quantities - See Sheet J40-52-25.					5151			5151			5151			5151			
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail					62,333			62,804			62,984			63,441			
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail					63,023			63,494			63,674			64,131			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail					62,333			62,804			62,984			63,441			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail					63,023			63,494			63,674			64,131			
Stainless Steel Rail Total-Ibs. Single-Slope Rail					2221			2221			2221			2221			
Stainless Steel Rail Total-Ibs. Open Rail					2020			2020			2020			2020			

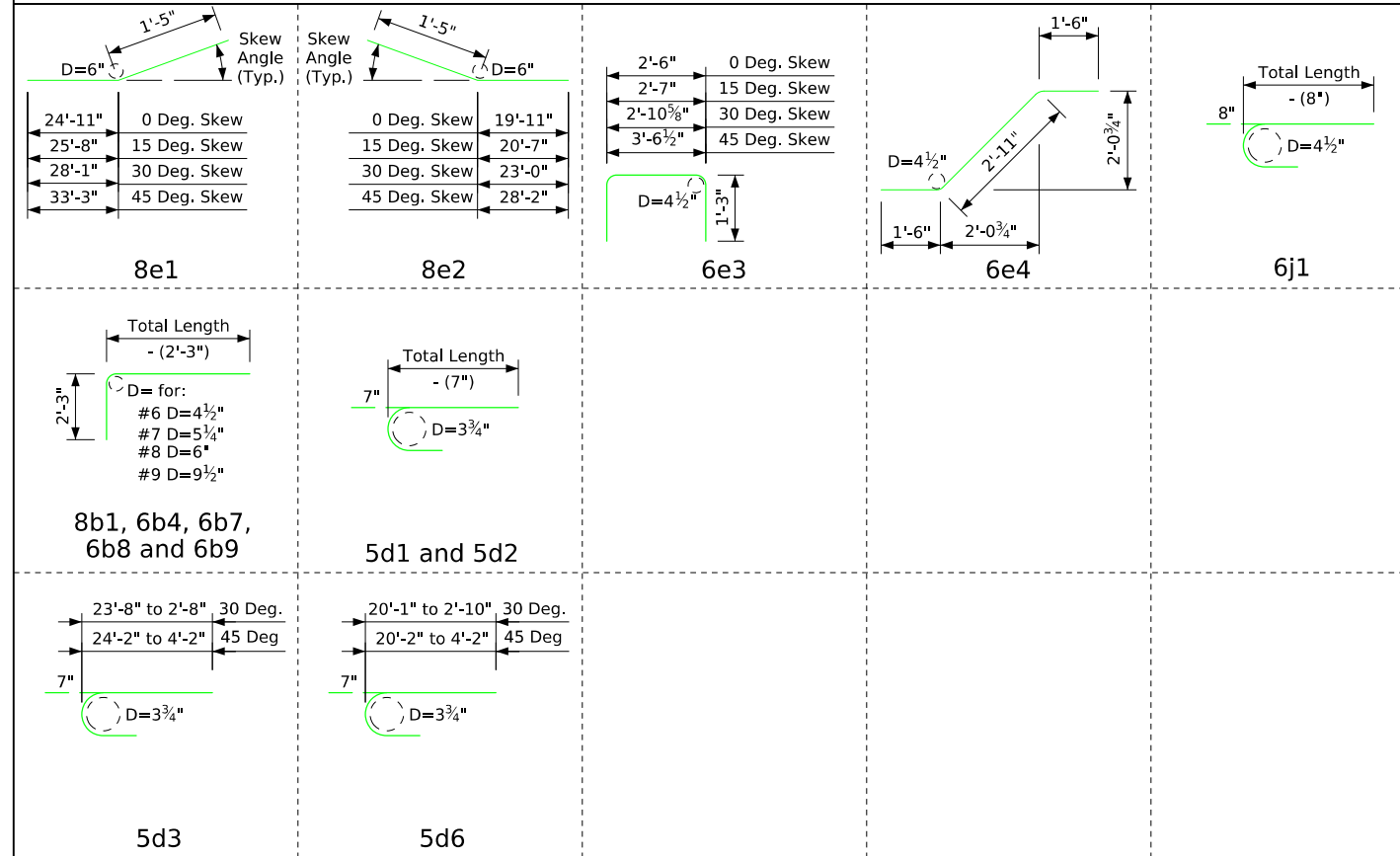
Estimated Quantities for Superstructure 100' Bridge

Item	Monolithic Cap				Non-Monolithic Cap			
	0°	15°	30°	45°	0°	15°	30°	45°
With Single-Slope Rail								
* Structural Concrete (Bridge) (c.y.)	257.2	258	260.2	265.3	260.5	261.3	264	269.9
Reinf. Steel Epoxy Coated (lbs.)	62,333	62,804	62,984	63,441	62,333	62,804	62,984	63,441
Δ Reinf. Steel Stainless Steel (lbs.)	2444	2444	2444	2444	2444	2444	2444	2444
Concrete single-slope barrier or open rail (lin.ft.)	222	222.2	222.9	224.5	222	222.2	222.9	224.5
With Open Rail								
* Structural Concrete (Bridge) (c.y.)	257	257.8	260	265.1	260.4	261.2	263.9	269.7
Reinf. Steel Epoxy Coated (lbs.)	63,023	63,494	63,674	64,131	63,023	63,494	63,674	64,131
Δ Reinf. Steel Stainless Steel (lbs.)	2243	2243	2243	2243	2243	2243	2243	2243

* Includes 4 wings at 1.114 cubic yard each; excludes rail concrete.

Δ Includes abutment paving notch bar weight.

100'-0 Bridge-Bent Bar Details



Note: All Dimensions Are Out To Out. D=pin Diameter.

Stainless Steel Reinforcing for Superstructure

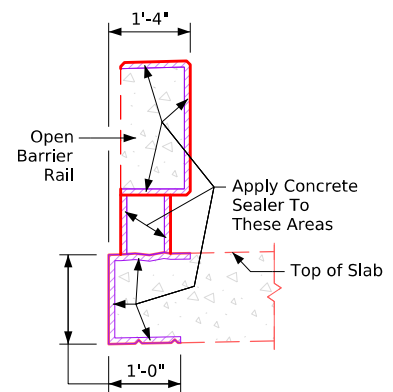
(All Skews)					
Location	Shape	Bar	No.	Length	Weight
Abutment Paving Notch Bar		8u1	40	2'-1	223

8u1 bars are to be paid for under the price bid for "Reinforcing Steel, Stainless Steel". Weight = lbs.

Note: See J40-26-25 Sheet for Monolithic Pier Cap reinforcing details and quantities. See J40-28-25 Sheet for Non-Monolithic Pier Cap reinforcing details and quantities.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge
	Continuous Concrete Slab Bridge July, 2025
	Superstructure Details 100'-0" Bridge Quantities

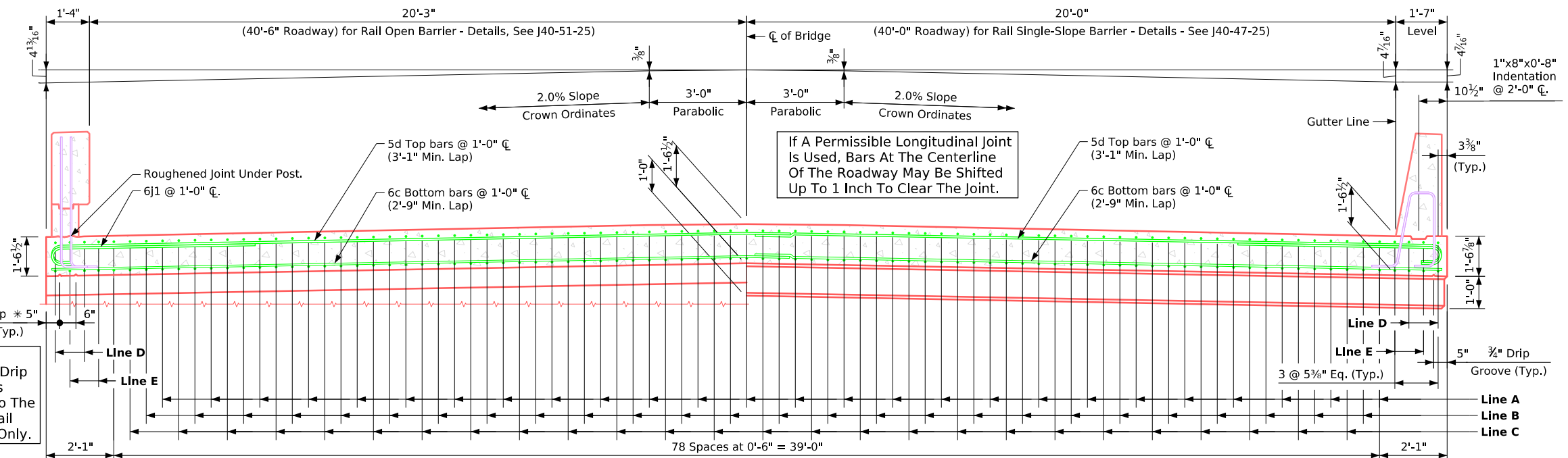
J40-09-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications** and **Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

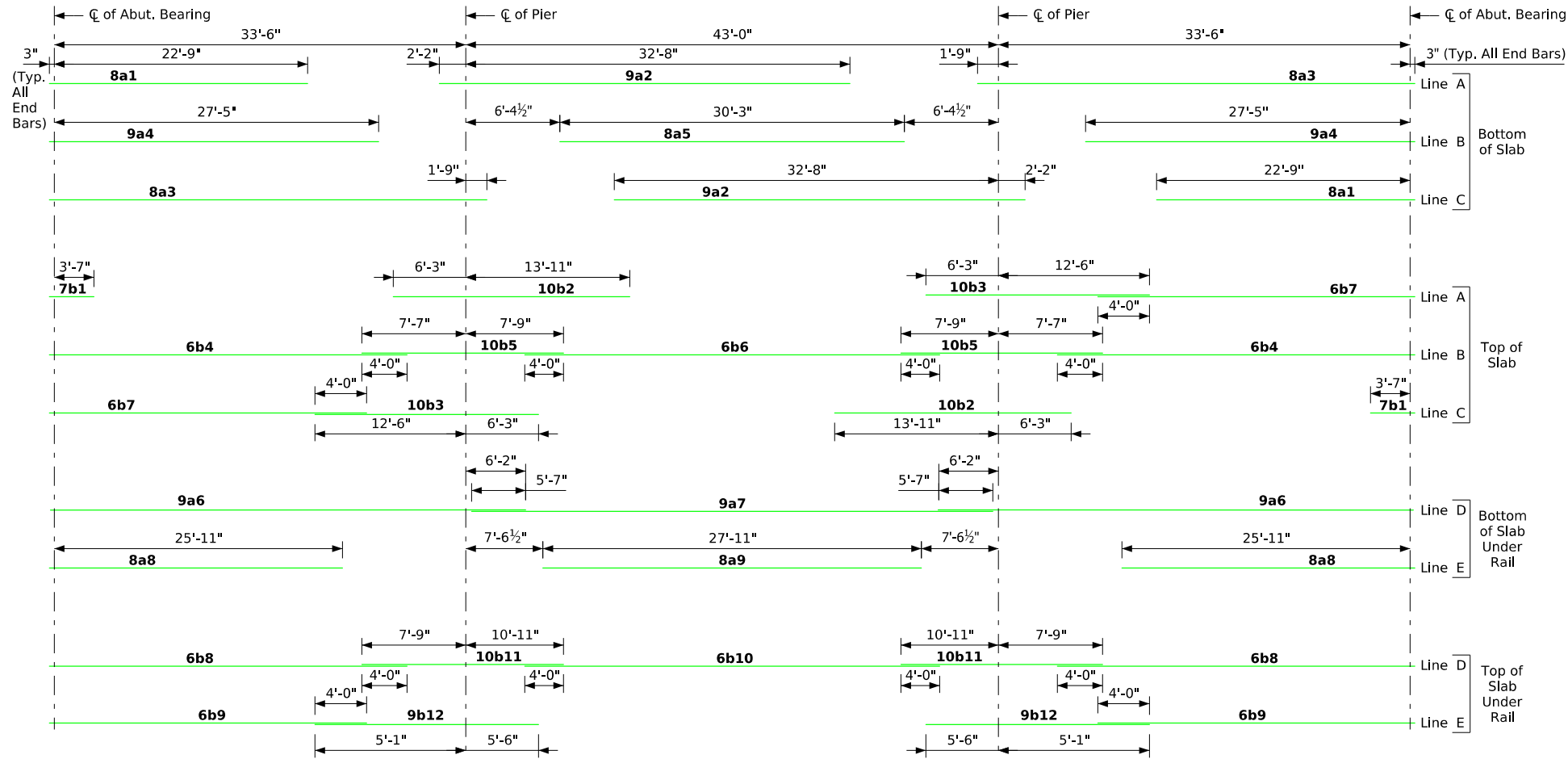
Slab Cross-Section Area For Open Rail = 66.55 sq. ft.

Note: Top longitudinal reinforcing steel shall be parallel to and 2 3/4 inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and 1 1/2 inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.

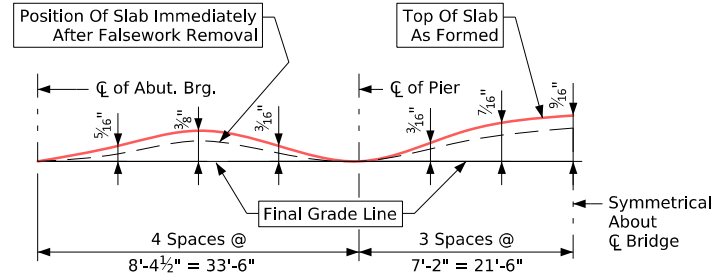
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 66.60 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.



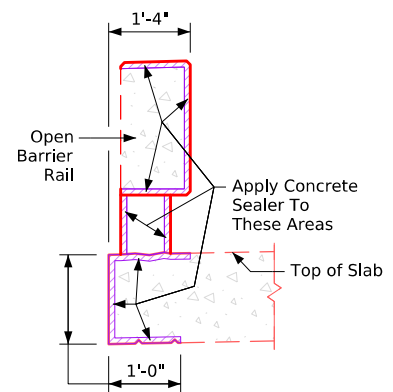
110' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

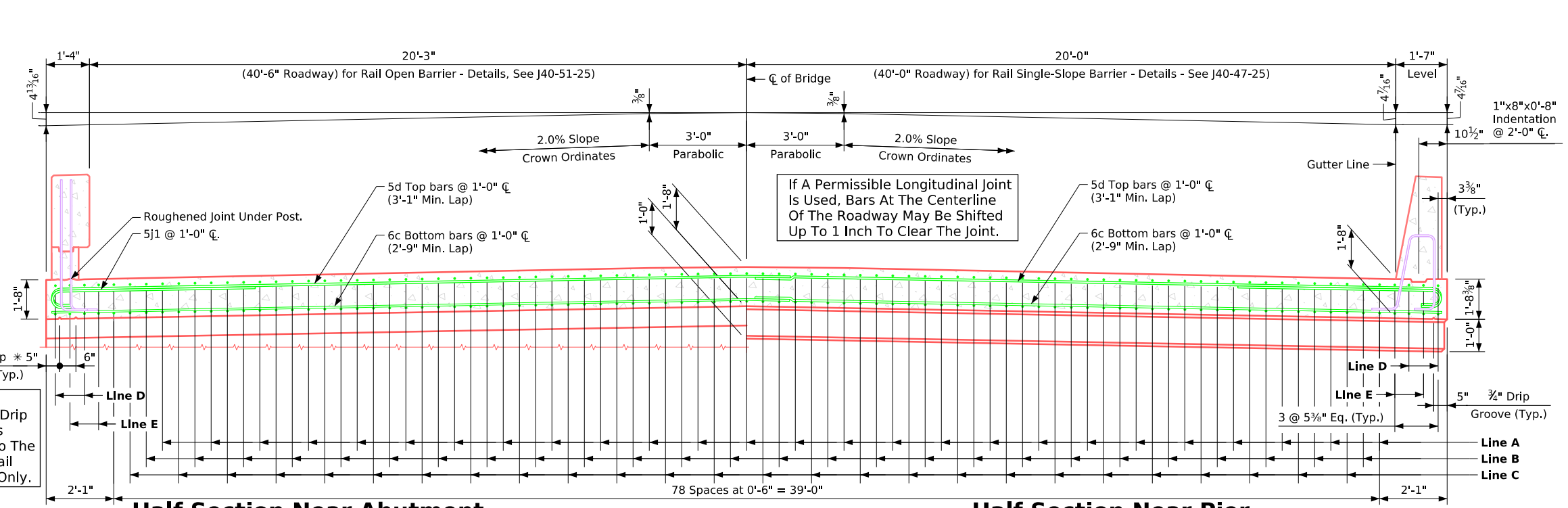
Latest Revision Date Approved by Bridge Engineer 	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Superstructure Details 110'-0" Bridge	J40-10-25	



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications and Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

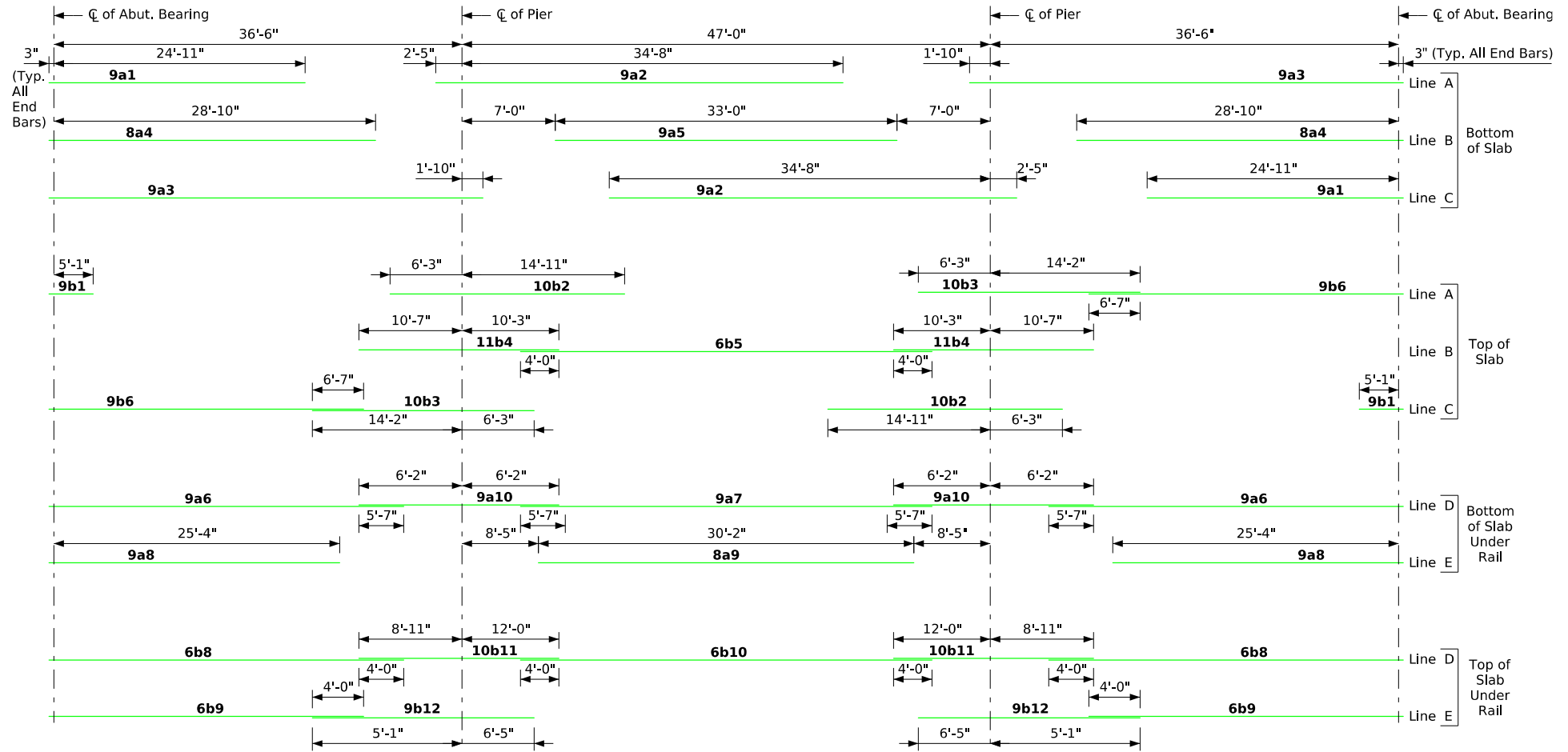
Slab Cross-Section Area For Open Rail = 71.94 sq. ft.

Note: Top longitudinal reinforcing steel shall be parallel to and 2 3/4 inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and 1 1/2 inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.

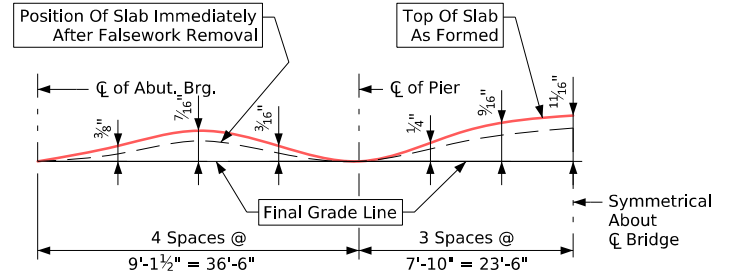
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 71.99 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.



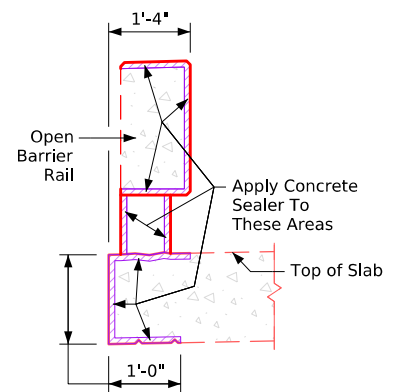
120' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

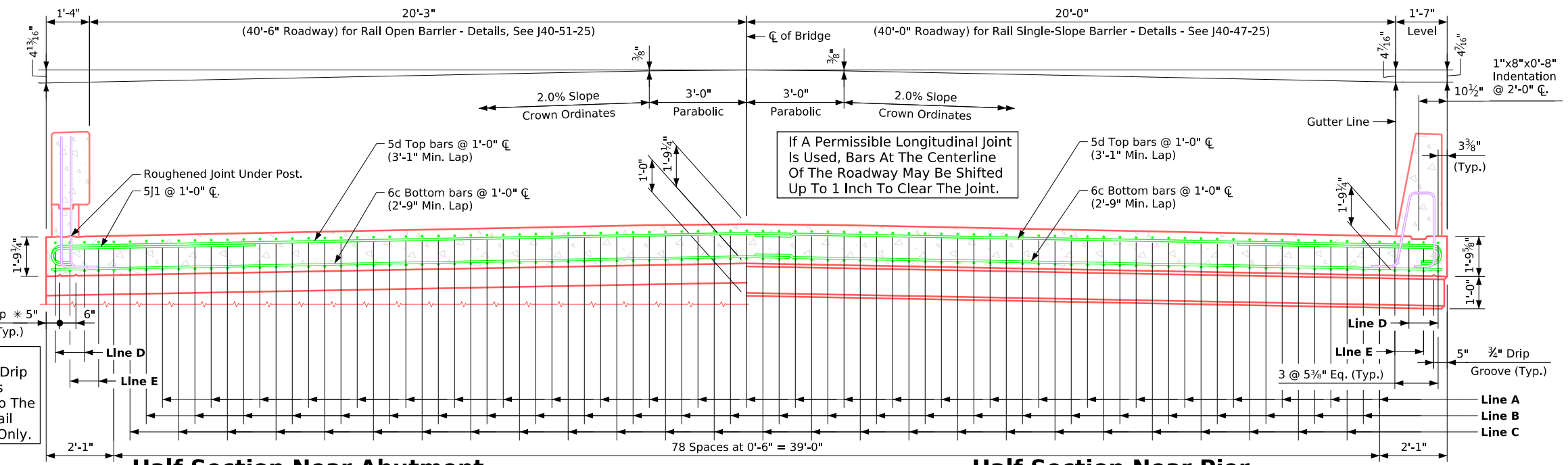
Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Superstructure Details 120'-0" Bridge	J40-12-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications** and **Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

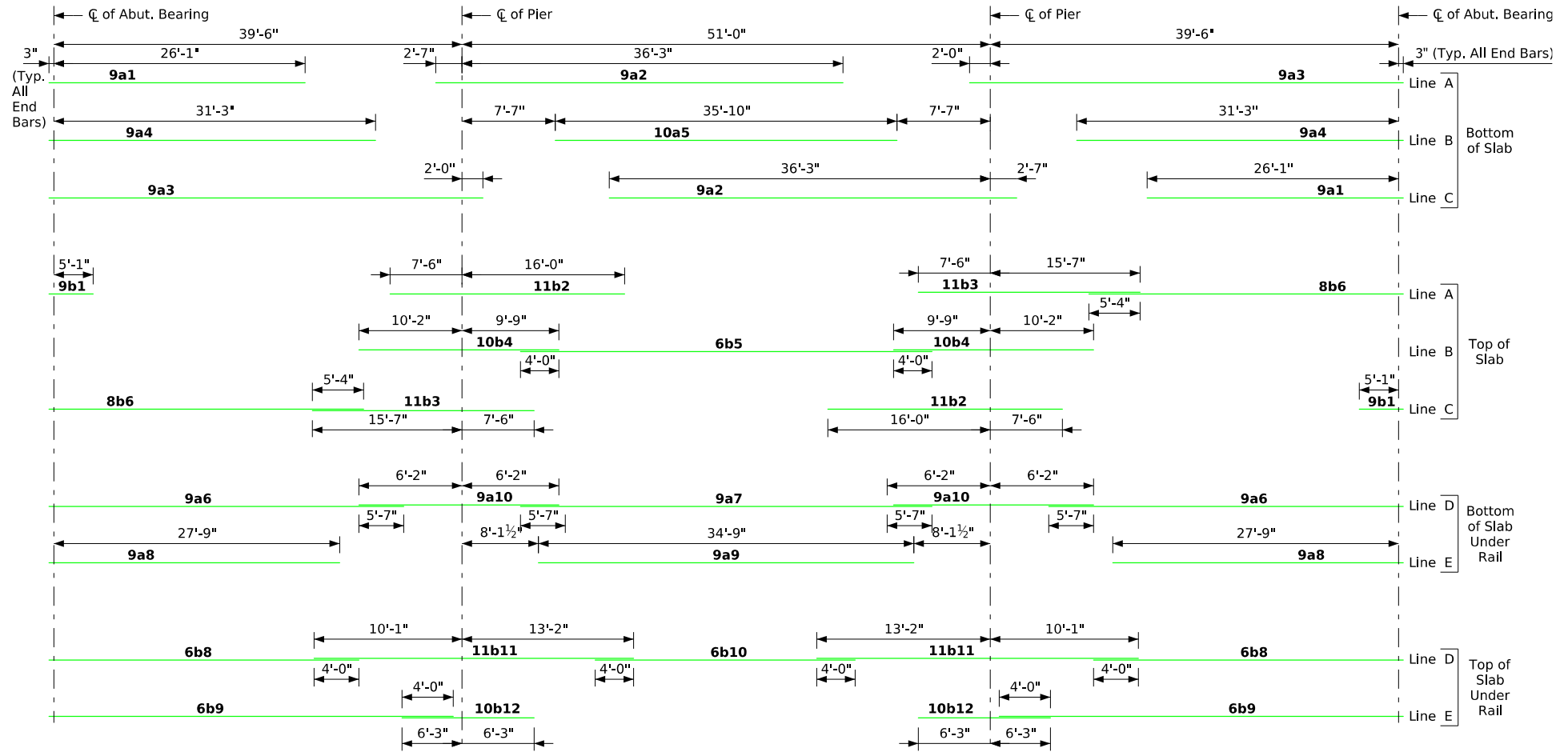
Half Section Near Pier

Slab Cross-Section Area For Open Rail = 76.44 sq. ft.

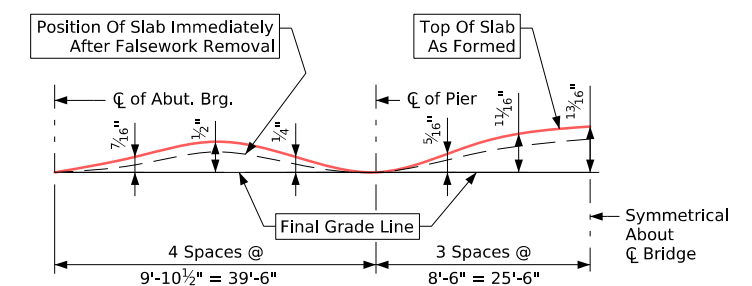
Slab Cross-Section Area For Single-Slope Barrier Rail = 76.49 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.

Note: Top longitudinal reinforcing steel shall be parallel to and $2\frac{3}{4}$ inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and $1\frac{1}{2}$ inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.



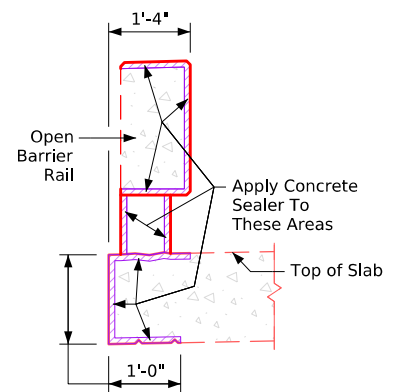
130' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

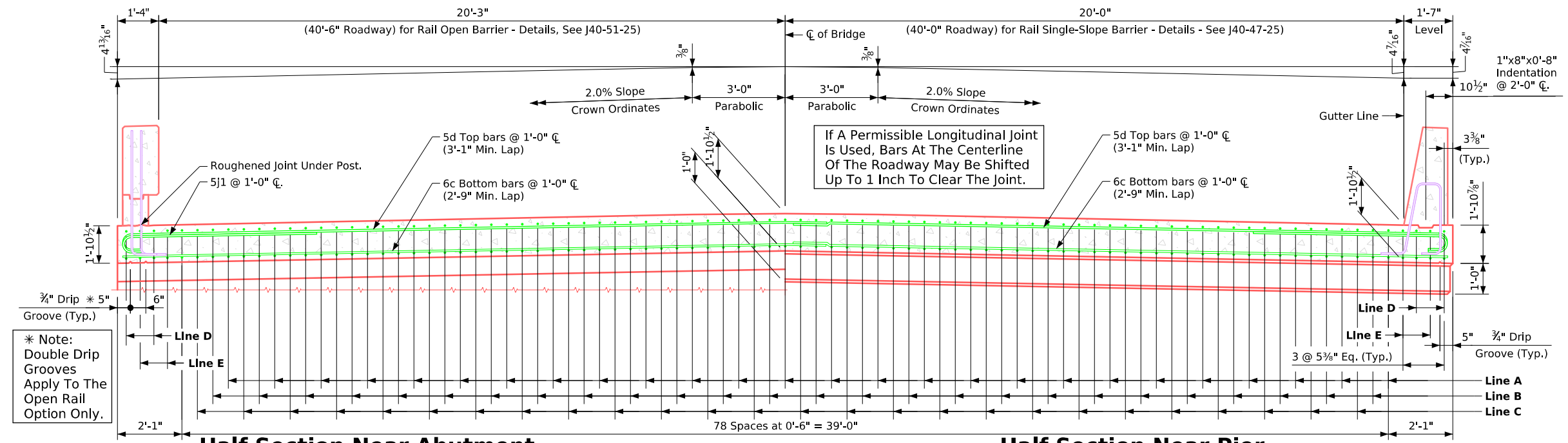
Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Superstructure Details 130'-0" Bridge	J40-14-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications and Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

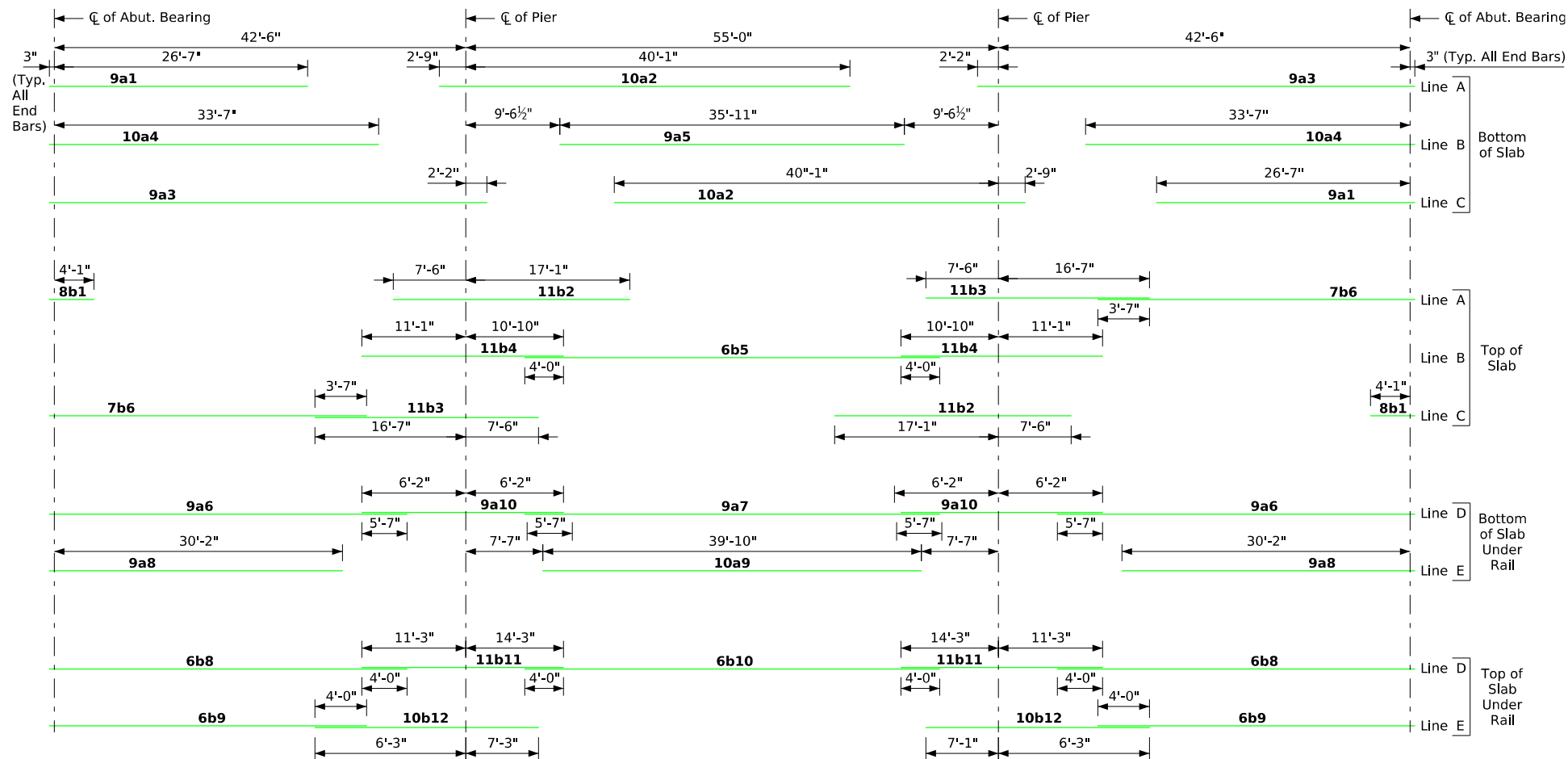
Slab Cross-Section Area For Open Rail = 80.94 sq. ft.

Half Section Near Pier

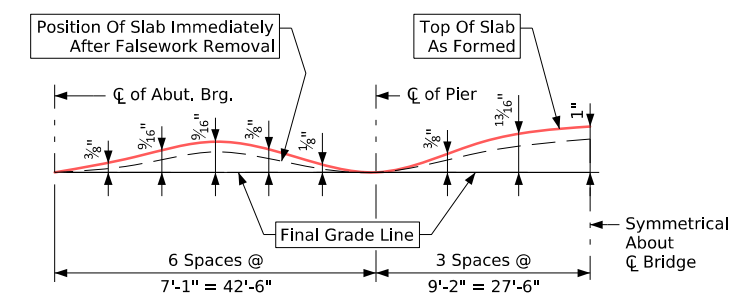
Slab Cross-Section Area For Single-Slope Barrier Rail = 80.99 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.

Note: Top longitudinal reinforcing steel shall be parallel to and $2\frac{3}{4}$ inches clear below the top of the slab. Bottom longitudinal reinforcing steel shall be parallel to and $1\frac{1}{2}$ inches clear above the bottom of the slab. Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.



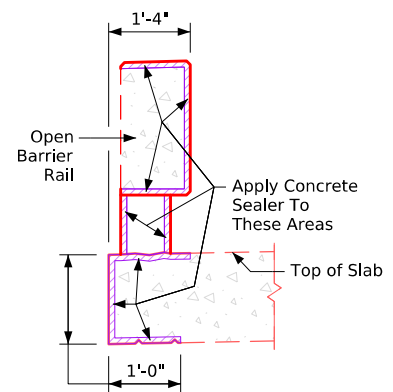
140' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

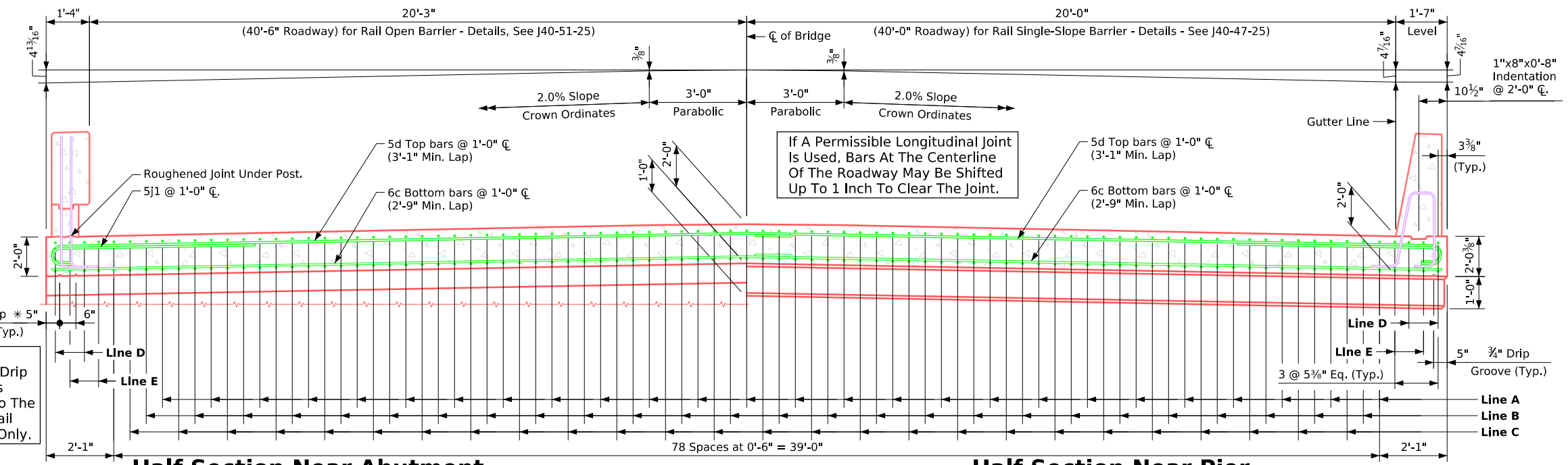
Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Superstructure Details 140'-0" Bridge	J40-16-25



Concrete Sealer Application Limits - Open Rail Section

- Apply concrete sealer to:**
- The entire top surface, edges, and underside of the bridge slab.
 - The top, traffic face, side and bottom surfaces of all Open Rail components.
 - All faces of Open Rail Posts.
 - Apply sealer continuously over the full bridge length.
 - Sealer application shall conform to **Article 2403.03, P.3** of the **Standard Specifications and Materials I.M. 491.12**.

* Note: Double Drip Grooves Apply To The Open Rail Option Only.



Half Section Near Abutment

Slab Cross-Section Area For Open Rail = 86.33 sq. ft.

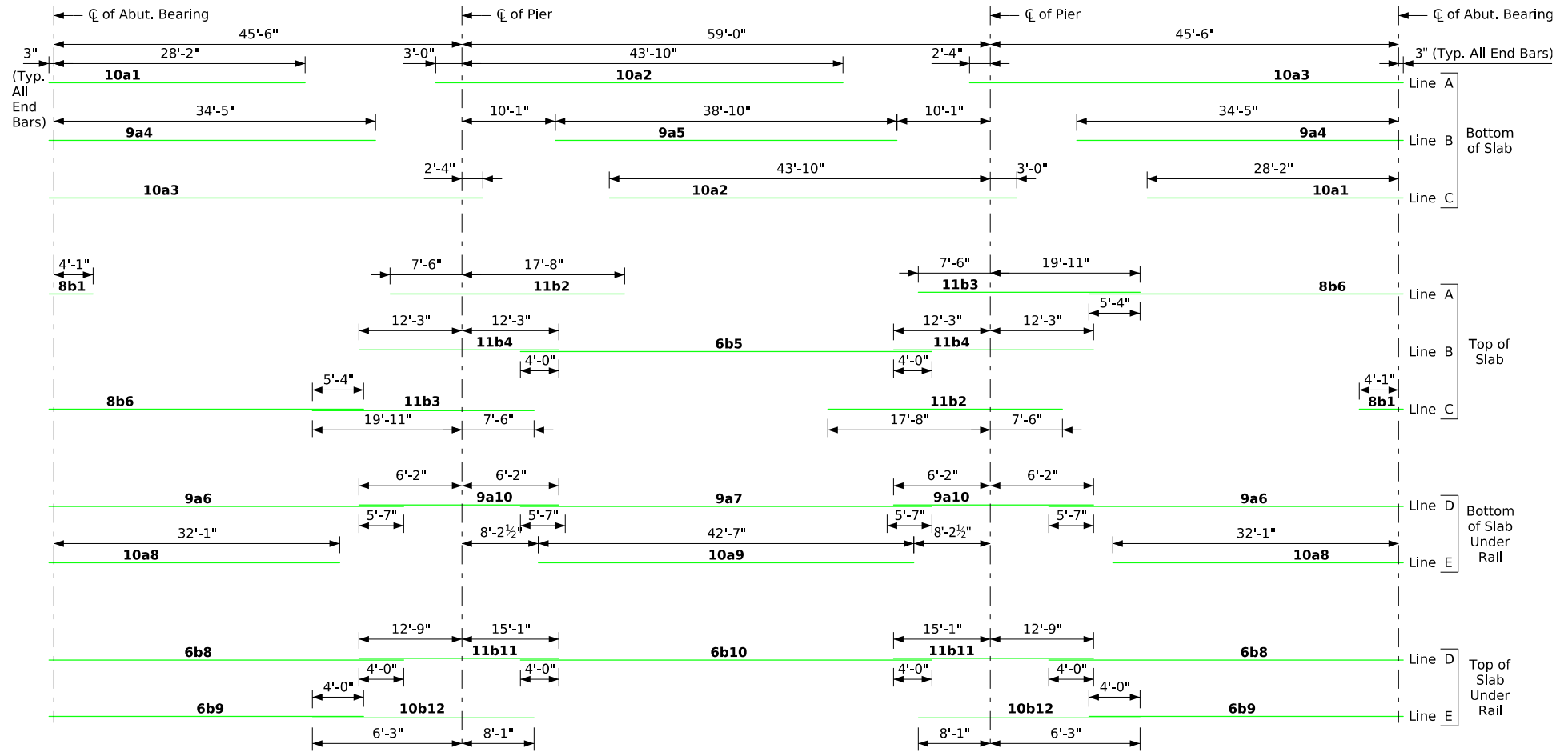
Note:

Top longitudinal reinforcing steel shall be parallel to and $2\frac{3}{4}$ inches clear below the top of the slab.
 Bottom longitudinal reinforcing steel shall be parallel to and $1\frac{1}{2}$ inches clear above the bottom of the slab.
 Reinforcing steel shall be securely wired in place and adequately supported on bar chairs before concrete placement.

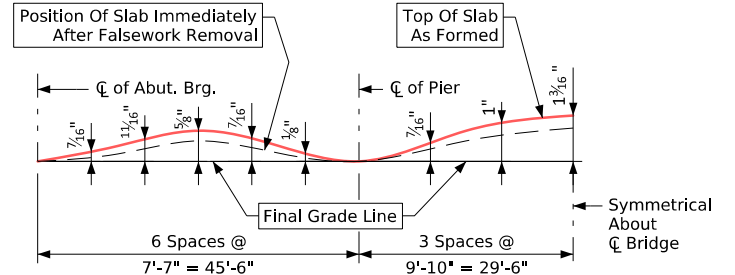
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 86.38 sq. ft.

I.M. 451.01 Requirements Shall Apply For Bar Chairs.



150' - Placement for Longitudinal Reinforcement



Form Camber Diagram

This diagram illustrates the form camber required to compensate for the anticipated ultimate dead load deflection. The dimensions shown do not account for form deflection or falsework settlement.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Superstructure Details 150'-0" Bridge	J40-18-25

Epoxy Steel Reinforcing for Superstructure-150' Bridge

Location	Degree Skew	0				15				30				45			
		Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length
Slab Longitudinal Bottom		10a1	53	28'-5"	6481	53	28'-5"	6481	53	28'-5"	6481	53	28'-5"	6481			
Slab Longitudinal Bottom		10a2	53	46'-10"	10,681	53	46'-10"	10,681	53	46'-10"	10,681	53	46'-10"	10,681			
Slab Longitudinal Bottom		10a3	53	48'-1"	10,966	53	48'-1"	10,966	53	48'-1"	10,966	53	48'-1"	10,966			
Slab Longitudinal Bottom		9a4	52	34'-8"	6130	52	34'-8"	6130	52	34'-8"	6130	52	34'-8"	6130			
Slab Longitudinal Bottom		9a5	26	38'-10"	3433	26	38'-10"	3433	26	38'-10"	3433	26	38'-10"	3433			
Slab Longitudinal Bottom, at Rail		9a6	8	45'-2"	1229	8	45'-2"	1229	8	45'-2"	1229	8	45'-2"	1229			
Slab Longitudinal Bottom, at Rail		9a7	4	57'-10"	787	4	57'-10"	787	4	57'-10"	787	4	57'-10"	787			
Slab Longitudinal Bottom, at Rail		10a8	8	32'-4"	1114	8	32'-4"	1114	8	32'-4"	1114	8	32'-4"	1114			
Slab Longitudinal Bottom, at Rail		10a9	4	42'-7"	733	4	42'-7"	733	4	42'-7"	733	4	42'-7"	733			
Slab Longitudinal Bottom, at Rail		9a10	8	12'-4"	336	8	12'-4"	336	8	12'-4"	336	8	12'-4"	336			
Slab Longitudinal Top		8b1	53	6'-7"	932	53	6'-7"	932	53	6'-7"	932	53	6'-7"	932			
Slab Longitudinal Top		11b2	53	25'-2"	7087	53	25'-2"	7087	53	25'-2"	7087	53	25'-2"	7087			
Slab Longitudinal Top		11b3	53	27'-5"	7721	53	27'-5"	7721	53	27'-5"	7721	53	27'-5"	7721			
Slab Longitudinal Top		11b4	52	24'-6"	6769	52	24'-6"	6769	52	24'-6"	6769	52	24'-6"	6769			
Slab Longitudinal Top		6b5	26	42'-6"	1660	26	42'-6"	1660	26	42'-6"	1660	26	42'-6"	1660			
Slab Longitudinal Top		7b6	53	31'-8"	3431	53	31'-8"	3431	53	31'-8"	3431	53	31'-8"	3431			
Slab Longitudinal Top, at Rail		6b8	8	39'-3"	472	8	39'-3"	472	8	39'-3"	472	8	39'-3"	472			
Slab Longitudinal Top, at Rail		6b9	8	45'-9"	550	8	45'-9"	550	8	45'-9"	550	8	45'-9"	550			
Slab Longitudinal Top, at Rail		6b10	4	36'-10"	222	4	36'-10"	222	4	36'-10"	222	4	36'-10"	222			
Slab Longitudinal Top, at Rail		11b11	8	27'-10"	1184	8	27'-10"	1184	8	27'-10"	1184	8	27'-10"	1184			
Slab Longitudinal Top, at Rail		10b12	8	14'-4"	494	8	14'-4"	494	8	14'-4"	494	8	14'-4"	494			
Slab Transverse Bottom		6c1	147	24'-4"	5373	147	25'-2"	5557	137	24'-4"	5008	127	24'-4"	4642			
Slab Transverse Bottom		6c2	147	21'-3"	4692	147	22'-0"	4858	139	21'-3"	4437	131	21'-3"	4182			
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	13	VARIABLES	262	21	VARIABLES	447			
Slab Transverse Ends, Bottom		6c4	-	-	-	-	-	-	11	VARIABLES	233	20	VARIABLES	386			
Slab Transverse Ends, Bottom		6c5	-	-	-	-	-	-	10	VARIABLES	173	17	VARIABLES	298			
Slab Transverse Ends, Bottom		6c6	-	-	-	-	-	-	11	VARIABLES	191	17	VARIABLES	311			
Slab Transverse Top		5d1	147	25'-3"	3872	147	26'-1"	4000	137	25'-3"	3608	127	25'-3"	3345			
Slab Transverse Top		5d2	147	21'-10"	3348	147	22'-7"	3463	139	21'-10"	3166	131	21'-10"	2984			
Slab Transverse Ends, Top		5d3	-	-	-	-	-	-	13	VARIABLES	188	21	VARIABLES	324			
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	11	VARIABLES	166	20	VARIABLES	275			
Slab Transverse Ends, Top		5d5	-	-	-	-	-	-	10	VARIABLES	120	17	VARIABLES	207			
Slab Transverse Ends, Top		5d6	-	-	-	-	-	-	11	VARIABLES	139	17	VARIABLES	227			
Slab, Transverse at Abutment		8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667			
Slab, Transverse at Abutment		8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422			
Slab, Transverse at Abutment		6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841			
Slab, Transverse at Abutment		6e4	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818	92	5'-11"	818			
Top of Slab, Transverse, at Rail		5j1	292	6'-9"	2056	292	6'-9"	2056	282	6'-9"	1986	276	6'-9"	1944			
Wing, Vertical		5m1	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185	40	4'-5"	185			
Wing, Horizontal Back Face		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334			
Epoxy Reinforcing Total Weight (lbs)					96,073			96,746			96,767			97,251			
Rail Single-Slope Barrier - Quantities - See Sheet J40-48-25.					6153			6153			6153			6153			
Rail Open Barrier - Quantities - See Sheet J40-52-25.					7146			7146			7146			7146			
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail					102,226			102,899			102,920			103,404			
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail					103,219			103,892			103,913			104,397			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail					102,226			102,899			102,920			103,404			
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail					103,219			103,892			103,913			104,397			
Stainless Steel Rail Total-Ibs. Single-Slope Rail					3349			3349			3349			3349			
Stainless Steel Rail Total-Ibs. Open Rail					2925			2925			2925			2925			

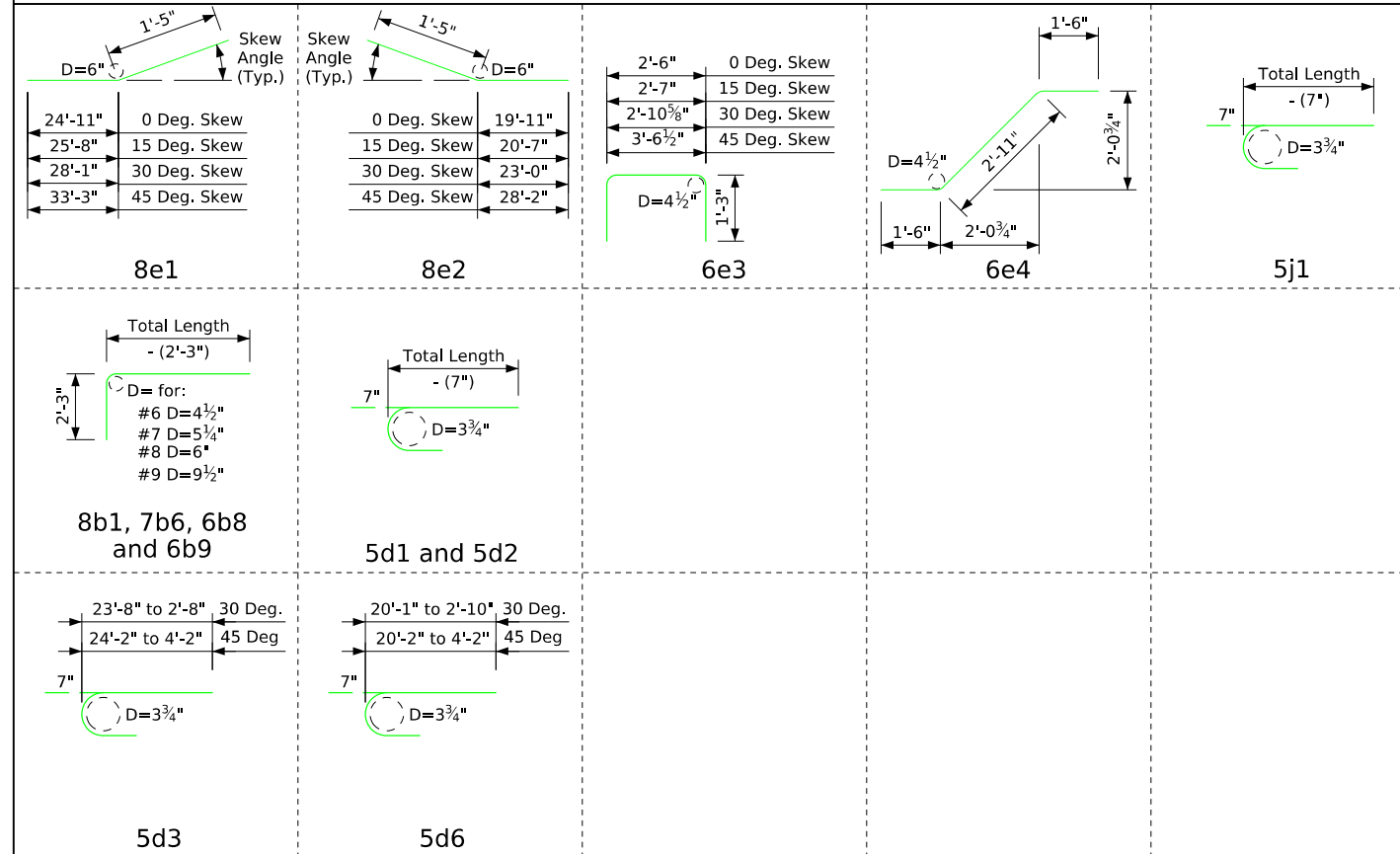
Estimated Quantities for Superstructure 150' Bridge

Item	Monolithic Cap				Non-Monolithic Cap			
	0°	15°	30°	45°	0°	15°	30°	45°
With Single-Slope Rail								
* Structural Concrete (Bridge) (c.y.)	501.1	501.9	503.7	508.2	504.5	505.2	507.6	512.8
Reinf. Steel Epoxy Coated (lbs.)	102,226	102,899	102,920	103,404	102,226	102,899	102,920	103,404
Δ Reinf. Steel Stainless Steel (lbs.)	3572	3572	3572	3572	3572	3572	3572	3572
Concrete single-slope barrier or open rail (lin.ft.)	322	322.2	322.9	324.5	322	322.2	322.9	324.5
With Open Rail								
* Structural Concrete (Bridge) (c.y.)	500.9	501.6	503.4	507.9	504.2	504.9	507.3	512.5
Reinf. Steel Epoxy Coated (lbs.)	103,219	103,892	103,913	104,397	103,219	103,892	103,913	104,397
Δ Reinf. Steel Stainless Steel (lbs.)	3148	3148	3148	3148	3148	3148	3148	3148

* Includes 4 wings at 1.114 cubic yard each; excludes rail concrete.

Δ Includes abutment paving notch bar weight.

150'-0 Bridge-Bent Bar Details




Note: All Dimensions Are Out To Out. D=pin Diameter.

Stainless Steel Reinforcing for Superstructure

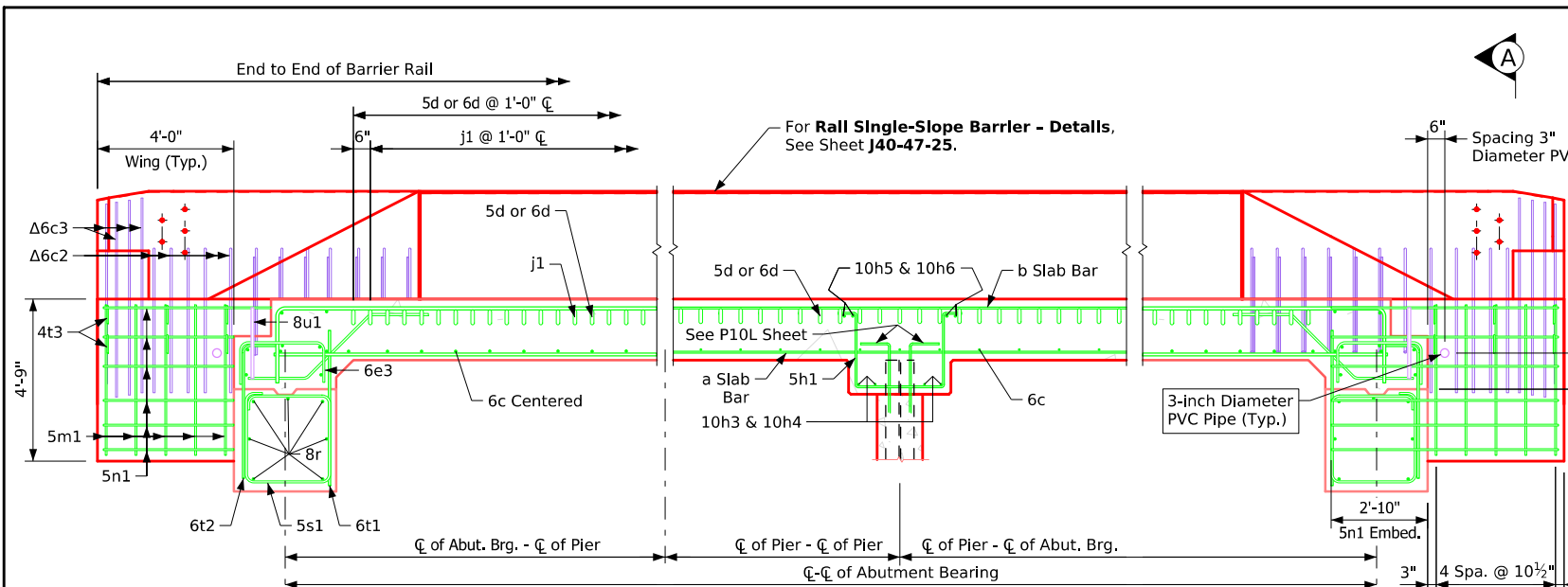
(All Skews)					
Location	Shape	Bar	No.	Length	Weight
Abutment Paving Notch Bar		8u1	40	2'-1	223

8u1 bars are to be paid for under the price bid for "Reinforcing Steel, Stainless Steel". Weight = lbs.

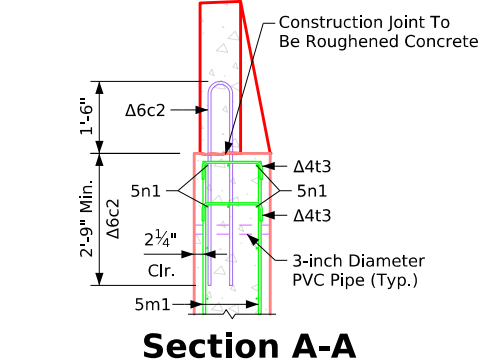
Note:
See J40-26-25 Sheet for Monolithic Pier Cap reinforcing details and quantities.
See J40-28-25 Sheet for Non-Monolithic Pier Cap reinforcing details and quantities.

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge
	Continuous Concrete Slab Bridge July, 2025
	Superstructure Details 150'-0" Bridge Quantities

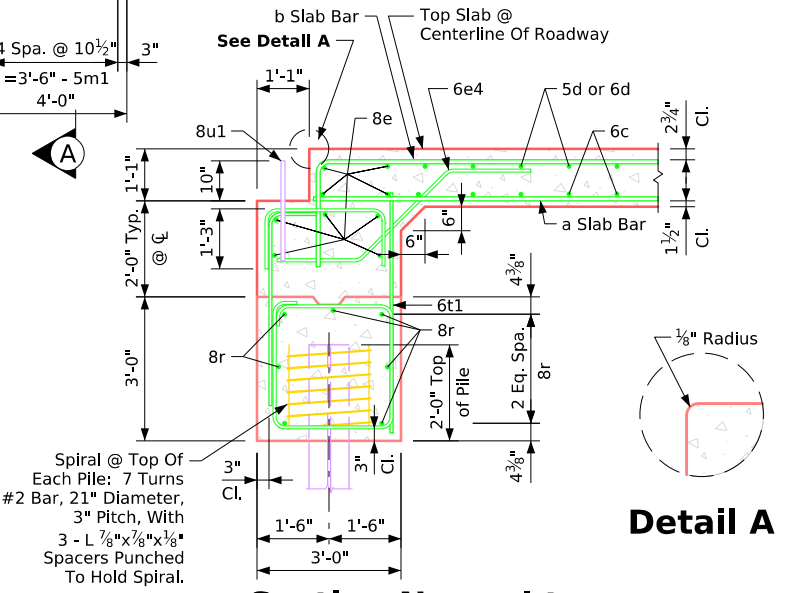
J40-19-25



Part Longitudinal Section Near Gutter Line
(Detail Not Shown For Open Barrier Rail, For **Rail Open Barrier - Details**, See Sheet **J40-51-25**)



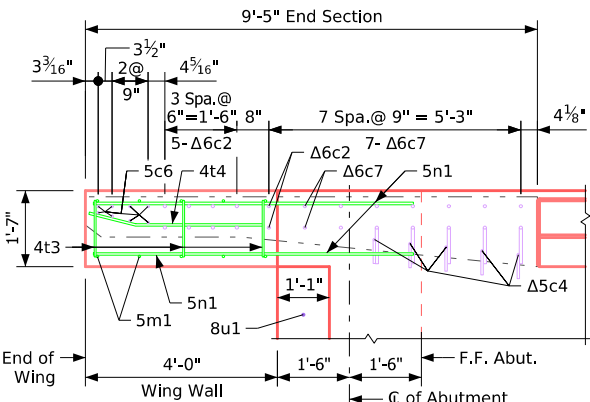
Section A-A
Δ Note: Refer to **Rail Single-Slope Barrier - End Section Details (1 of 2)** sheet on **J40-49-25** for details of the barrier rail end section. Reinforcing 6c2, 5c4, and 4t3 are included in the **Rail Single-Slope Barrier - End Section Details (2 of 2)** sheet on **J40-50-25**.
Note: 5m1 and 5n1 are included in the **Superstructure Quantities** sheet.



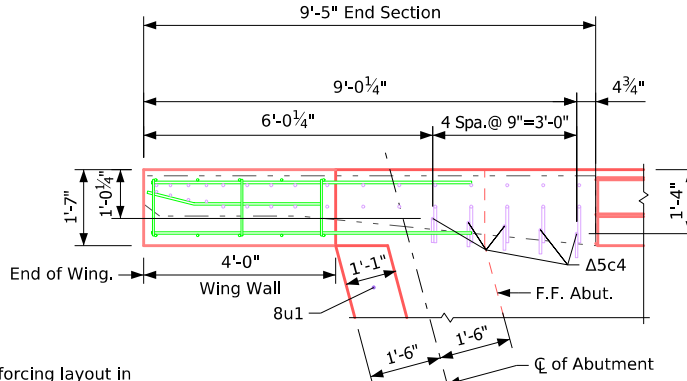
Section Normal to Abutment @ C
(Bridge Lengths 70-110ft)

Superstructure Notes:
This bridge is designed for HL-93 loading plus an allowance of 20 pounds per square foot of roadway for a future wearing surface.
The slab, as shown, includes a 3/4-inch integral wearing surface.
The minimum clear distance from the face of concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown. All reinforcing steel is to be securely wired in place. See **Bar Chair Note**.
All reinforcing shall be Grade 60.
The concrete slab is to be placed with a minimum of construction joints. Procedures for placing slab concrete shall be submitted for approval, together with a statement of the proposed method and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required result. Slab falsework shall be removed prior to the construction of the barrier rails unless slab construction is staged.
Note that when Portland cement approach pavement is placed, compressible joint material must be used between the pavement and the end of the bridge. If necessary to prevent damage to the end of the bridge deck or backwall from construction equipment, an appropriate method of protection approved by the Engineer shall be provided by the Bridge Contractor at no extra cost to the State.
The cost of furnishing and placing a 3-inch diameter PVC pipe in each wing is included in the price bid for "Structural Concrete (Bridge)".

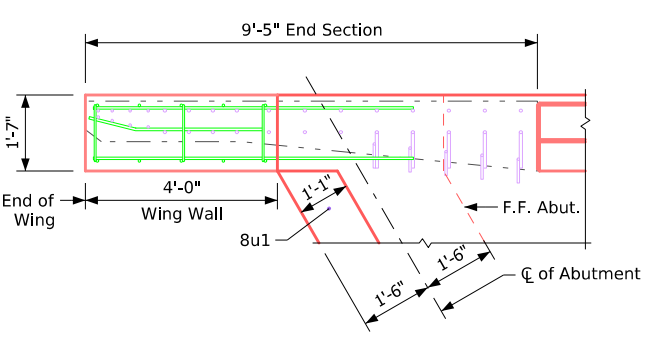
Bar Chair Note:
The top mat of reinforcing steel is to be supported by individual bar chairs spaced at no more than 3'-0" centers longitudinally and transversely. The bottom mat of reinforcing steel is to be supported by individual bar chairs spaced at no more than 3'-0" centers longitudinally and transversely, or by continuous rows of bar high chairs or slab bolsters spaced 4'-0" apart. **I.M. 451.01** requirements shall apply for bar chairs, bar high chairs, and slab bolsters.



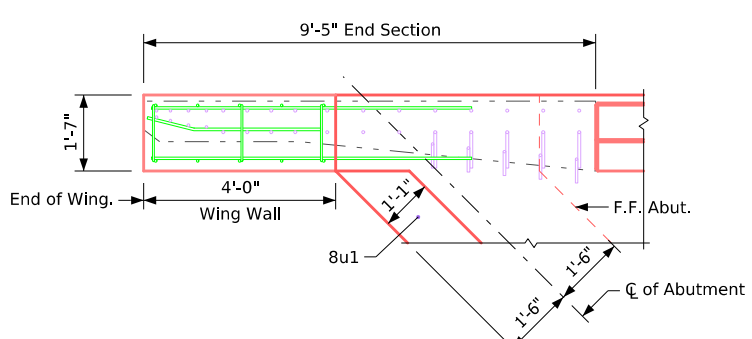
Part Plan 0° Skew
(End Section Not Shown)



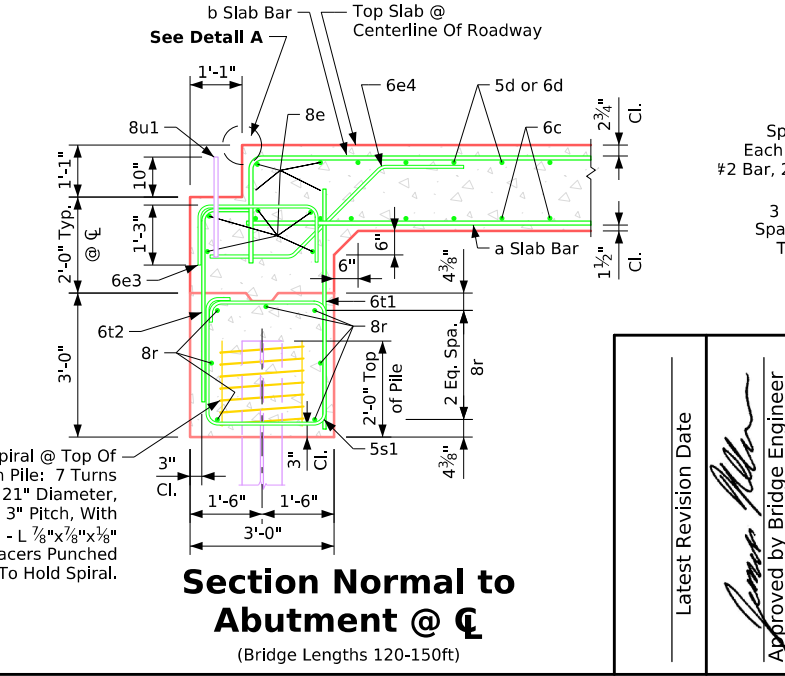
Part Plan 15° Skew
(End Section Not Shown)



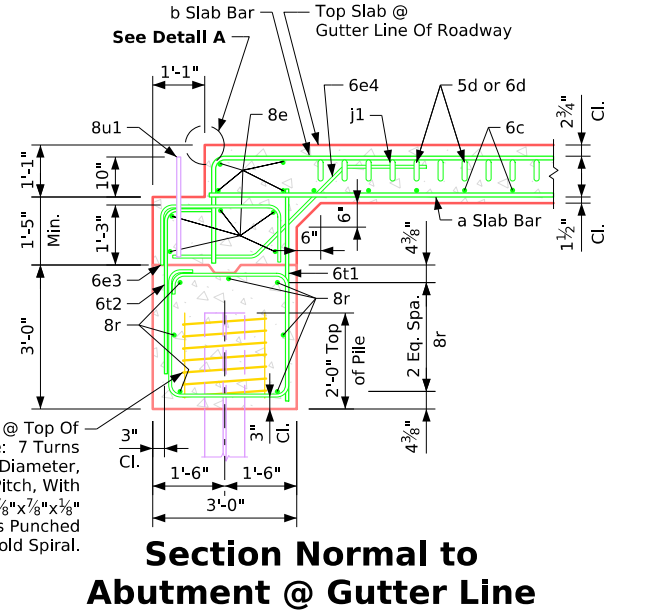
Part Plan 30° Skew
(End Section Not Shown)



Part Plan 45° Skew
(End Section Not Shown)

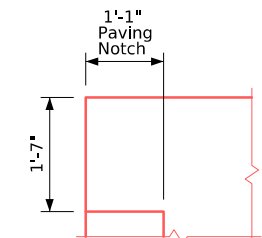
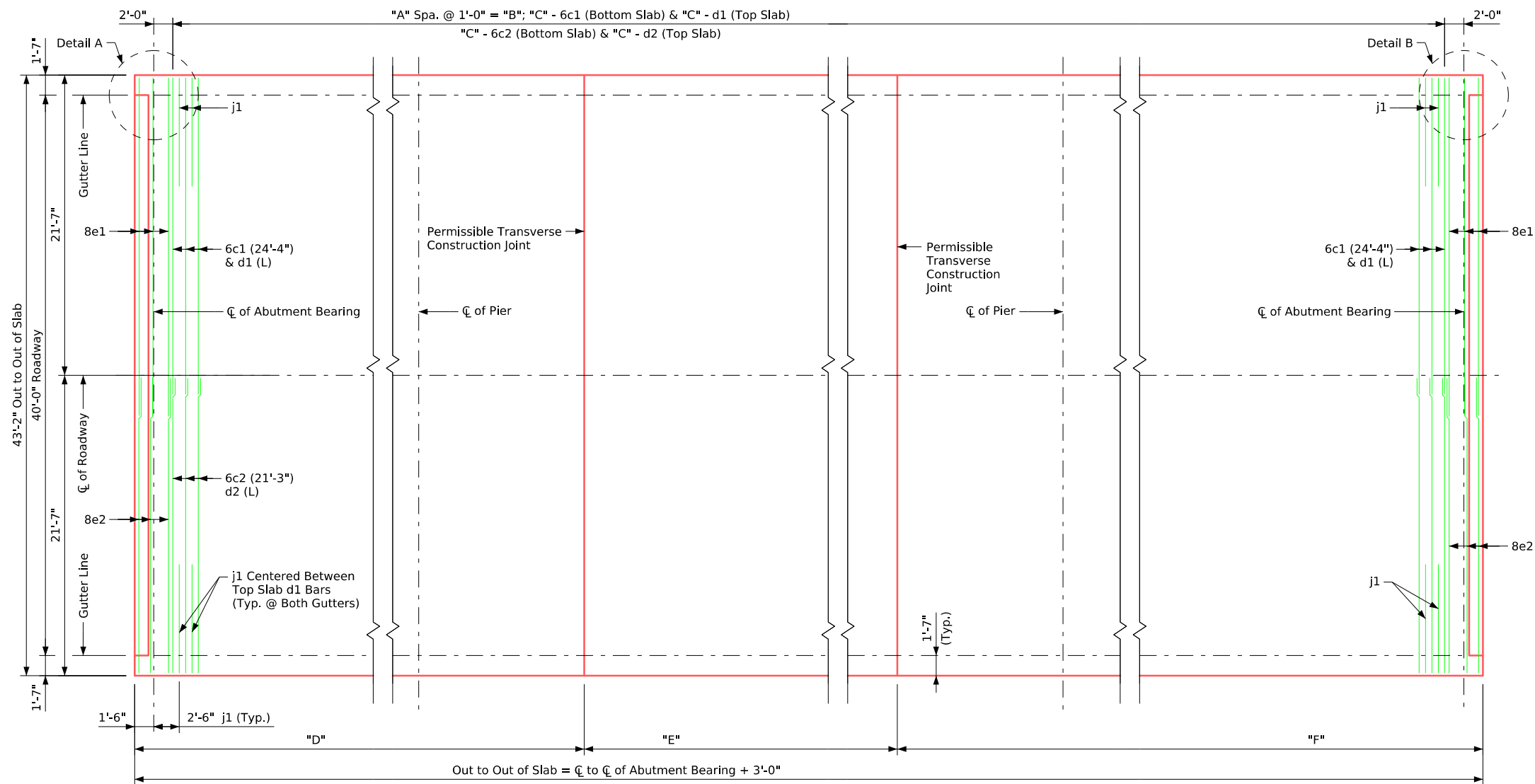


Section Normal to Abutment @ C
(Bridge Lengths 120-150ft)

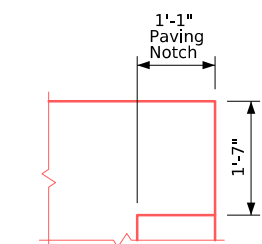


Section Normal to Abutment @ Gutter Line

Latest Revision Date	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer	July, 2025	
	Superstructure General Details	J40-20-25



Detail A



Detail B

j1 Bar Size Table

Bridge Length	Bar Size
70' to 90'	7
100' to 110'	6
120' to 150'	5

d Bar Size & Length Table

Bridge Length	Bar Size	d1 (L)	d2(L)
70'	6	25'-10"	21'-11"
80' to 150'	5	25'-3"	21'-10"

0° Transverse Reinforcement Dimensions - Table

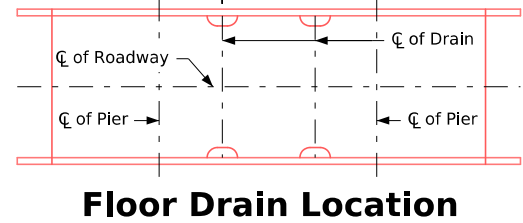
Bridge	"A"	"B"	"C"	"D"	"E"	"F"
70ft	66	66'-0"	67	28'-0"	17'-0"	28'-0"
80ft	76	76'-0"	77	32'-0"	19'-0"	32'-0"
90ft	86	86'-0"	87	36'-0"	21'-0"	36'-0"
100ft	96	96'-0"	97	40'-0"	23'-0"	40'-0"
110ft	106	106'-0"	107	44'-0"	25'-0"	44'-0"
120ft	116	116'-0"	117	48'-0"	27'-0"	48'-0"
130ft	126	126'-0"	127	52'-0"	29'-0"	52'-0"
140ft	136	136'-0"	137	56'-0"	31'-0"	56'-0"
150ft	146	146'-0"	147	60'-0"	33'-0"	60'-0"

0° Skew Transverse Reinforcing Steel Layout

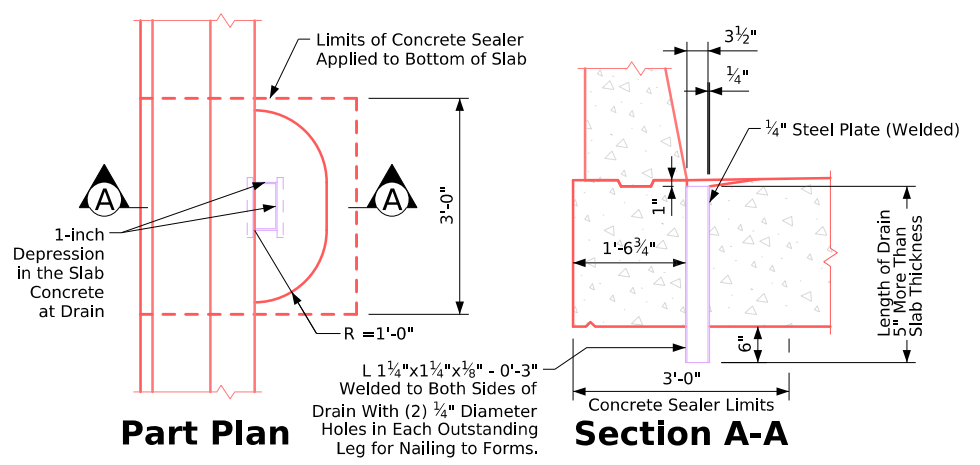
(Typical)

70'-0"	5'-6"
80'-0"	5'-6"
90'-0"	6'-6"
100'-0"	6'-6"
110'-0"	7'-6"
120'-0"	7'-6"
130'-0"	8'-6"
140'-0"	8'-6"
150'-0"	8'-6"

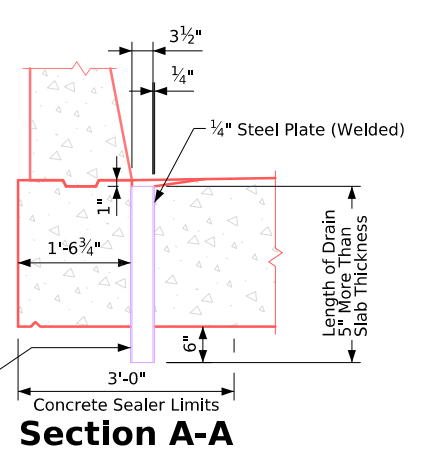
Note: 4" x 8" Outside dimension rolled tube with 1/4" wall thickness may be substituted for the welded drain shown.



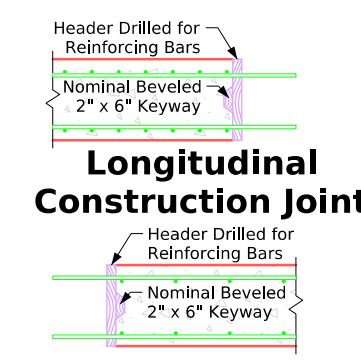
Floor Drain Location



Part Plan



Section A-A



Longitudinal Construction Joint



Transverse Construction Joint

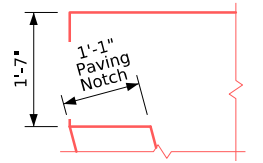
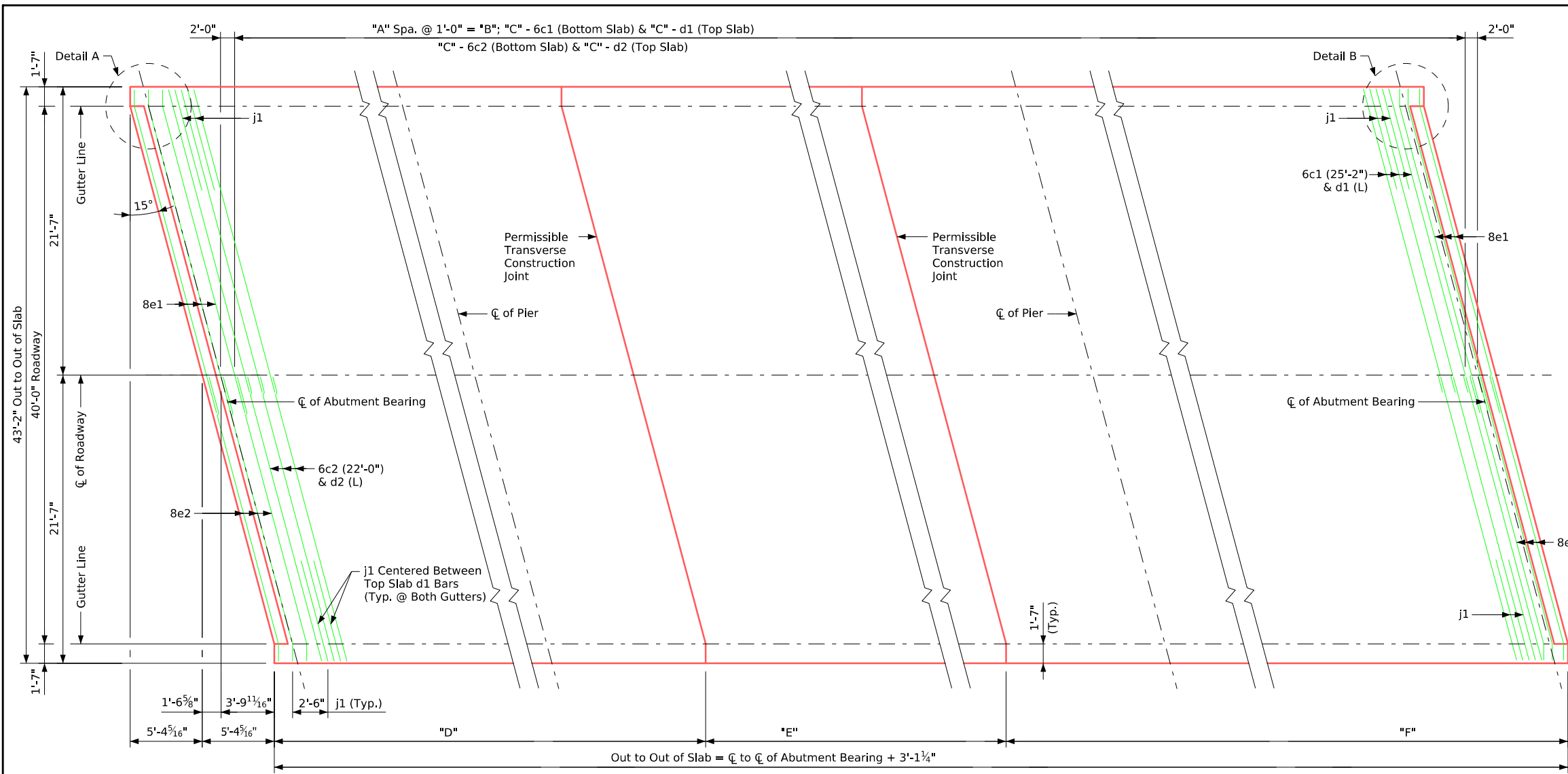
Weight of One Floor Drain

Span	Weight, lbs.	Span	Weight, lbs.
70'-0"	32	120'-0"	41
80'-0"	33	130'-0"	43
90'-0"	35	140'-0"	45
100'-0"	37	150'-0"	48
110'-0"	39		

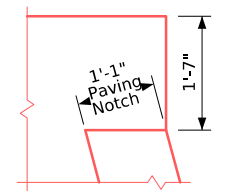
Floor Drain Details
 (Use for single slope barrier rail only, not required for open rail.)
 Note: Drains are to be galvanized. Include the cost of drains in the price bid for "Structural Concrete Bridge."
 (4 Drains Required)

Latest Revision Date
 Approved by Bridge Engineer
[Signature]

IOWA | DOT
 Standard Design-40'-0" Roadway, 3 Span Bridge
Continuous Concrete Slab Bridge
 July, 2025
 Superstructure Details
 0° Skew
J40-21-25



Detail A



Detail B

j1 Bar Size Table

Bridge Length	Bar Size
70' to 90'	7
100' to 110'	6
120' to 150'	5

d Bar Size & Length Table

Bridge Length	Bar Size	d1 (L)	d2 (L)
70'	6	26'-8"	22'-8"
80' to 150'	5	26'-1"	22'-7"

15° Skew Transverse Reinforcing Steel Layout

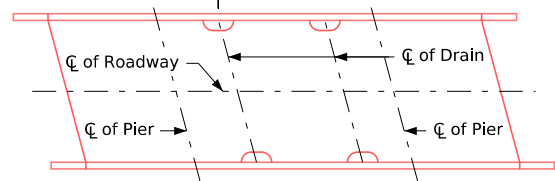
15° Transverse Reinforcement Dimensions - Table

Bridge	"A"	"B"	"C"	"D"	"E"	"F"
70ft	66	66'-0"	67	28'-0 3/8"	17'-0"	28'-0 3/8"
80ft	76	76'-0"	77	32'-0 3/8"	19'-0"	32'-0 3/8"
90ft	86	86'-0"	87	36'-0 3/8"	21'-0"	36'-0 3/8"
100ft	96	96'-0"	97	40'-0 3/8"	23'-0"	40'-0 3/8"
110ft	106	106'-0"	107	44'-0 3/8"	25'-0"	44'-0 3/8"
120ft	116	116'-0"	117	48'-0 3/8"	27'-0"	48'-0 3/8"
130ft	126	126'-0"	127	52'-0 3/8"	29'-0"	52'-0 3/8"
140ft	136	136'-0"	137	56'-0 3/8"	31'-0"	56'-0 3/8"
150ft	146	146'-0"	147	60'-0 3/8"	33'-0"	60'-0 3/8"

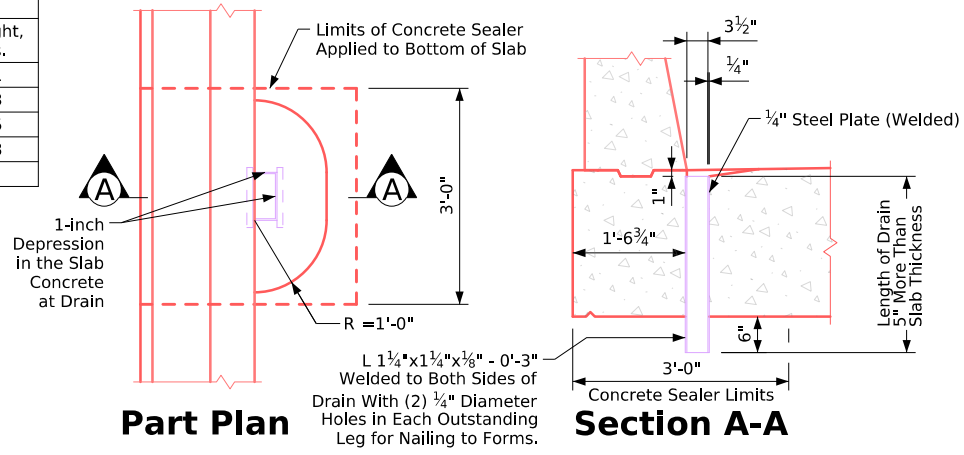
(Typical)

Span	Weight, lbs.	Span	Weight, lbs.
70'-0"	32	120'-0"	41
80'-0"	33	130'-0"	43
90'-0"	35	140'-0"	45
100'-0"	37	150'-0"	48
110'-0"	39		

Weight of One Floor Drain

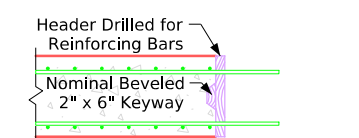


Floor Drain Location

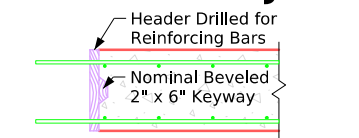


Floor Drain Details

(Use for single slope barrier rail only, not required for open rail.)
 Note: Drains are to be galvanized. Include the cost of drains in the price bid for "Structural Concrete Bridge."
 (4 Drains Required)



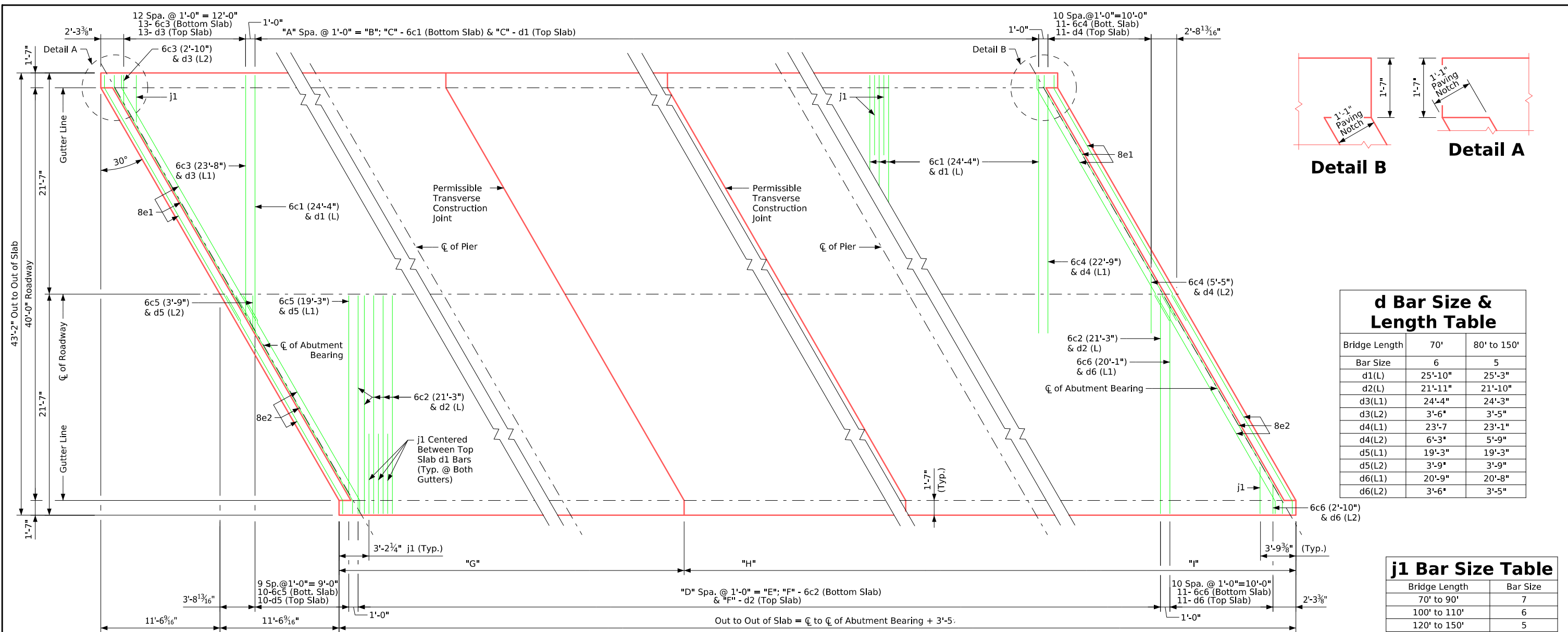
Longitudinal Construction Joint



Transverse Construction Joint

Latest Revision Date
 Approved by Bridge Engineer

IOWA | DOT
 Standard Design-40'-0" Roadway, 3 Span Bridge
Continuous Concrete Slab Bridge
 July, 2025
 Superstructure Details
 15° Skew
J40-22-25



d Bar Size & Length Table

Bridge Length	70'	80' to 150'
Bar Size	6	5
d1(L)	25'-10"	25'-3"
d2(L)	21'-11"	21'-10"
d3(L1)	24'-4"	24'-3"
d3(L2)	3'-6"	3'-5"
d4(L1)	23'-7"	23'-1"
d4(L2)	6'-3"	5'-9"
d5(L1)	19'-3"	19'-3"
d5(L2)	3'-9"	3'-9"
d6(L1)	20'-9"	20'-8"
d6(L2)	3'-6"	3'-5"

j1 Bar Size Table

Bridge Length	Bar Size
70' to 90'	7
100' to 110'	6
120' to 150'	5

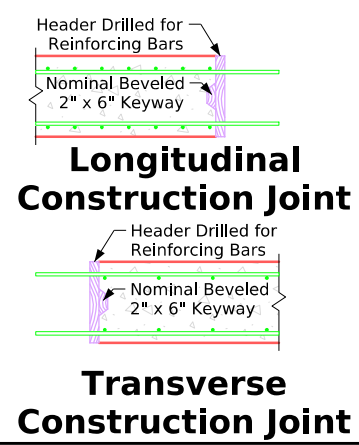
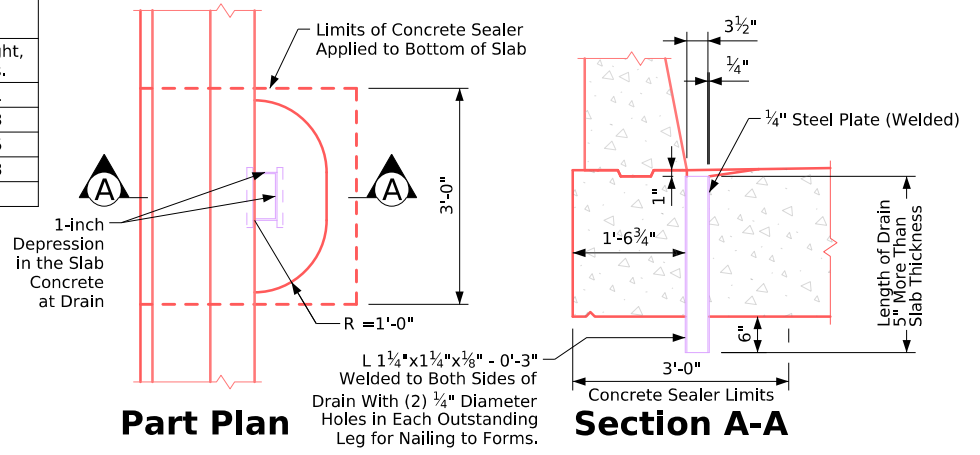
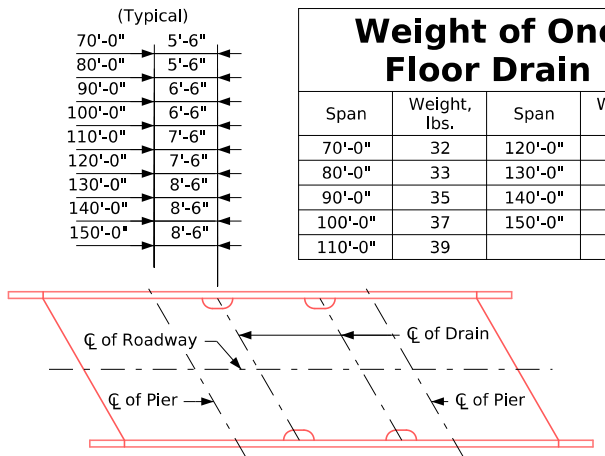
30° Skew Transverse Reinforcing Steel Layout

30° Transv. Reinf. Dim. Table

Bridge	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
70ft	56	56'-0"	57	58	58'-0"	59	27'-8½"	17'-0"	28'-9"
80ft	66	66'-0"	67	68	68'-0"	69	31'-8½"	19'-0"	32'-9"
90ft	76	76'-0"	77	78	78'-0"	79	35'-8½"	21'-0"	36'-9"
100ft	86	86'-0"	87	88	88'-0"	89	39'-8½"	23'-0"	40'-9"
110ft	96	96'-0"	97	98	98'-0"	99	43'-8½"	25'-0"	48'-9"
120ft	106	106'-0"	107	108	108'-0"	109	47'-8½"	27'-0"	49'-0"
130ft	116	116'-0"	117	118	118'-0"	119	51'-8½"	29'-0"	52'-9"
140ft	126	126'-0"	127	128	128'-0"	129	55'-8½"	31'-0"	56'-9"
150ft	136	136'-0"	137	138	138'-0"	139	59'-8½"	33'-0"	60'-9"

Weight of One Floor Drain

Span	Weight, lbs.	Span	Weight, lbs.
70'-0"	32	120'-0"	41
80'-0"	33	130'-0"	43
90'-0"	35	140'-0"	45
100'-0"	37	150'-0"	48
110'-0"	39		



Latest Revision Date
 Approved by Bridge Engineer
[Signature]

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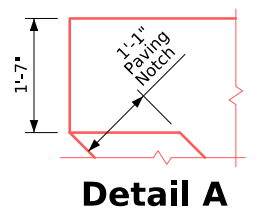
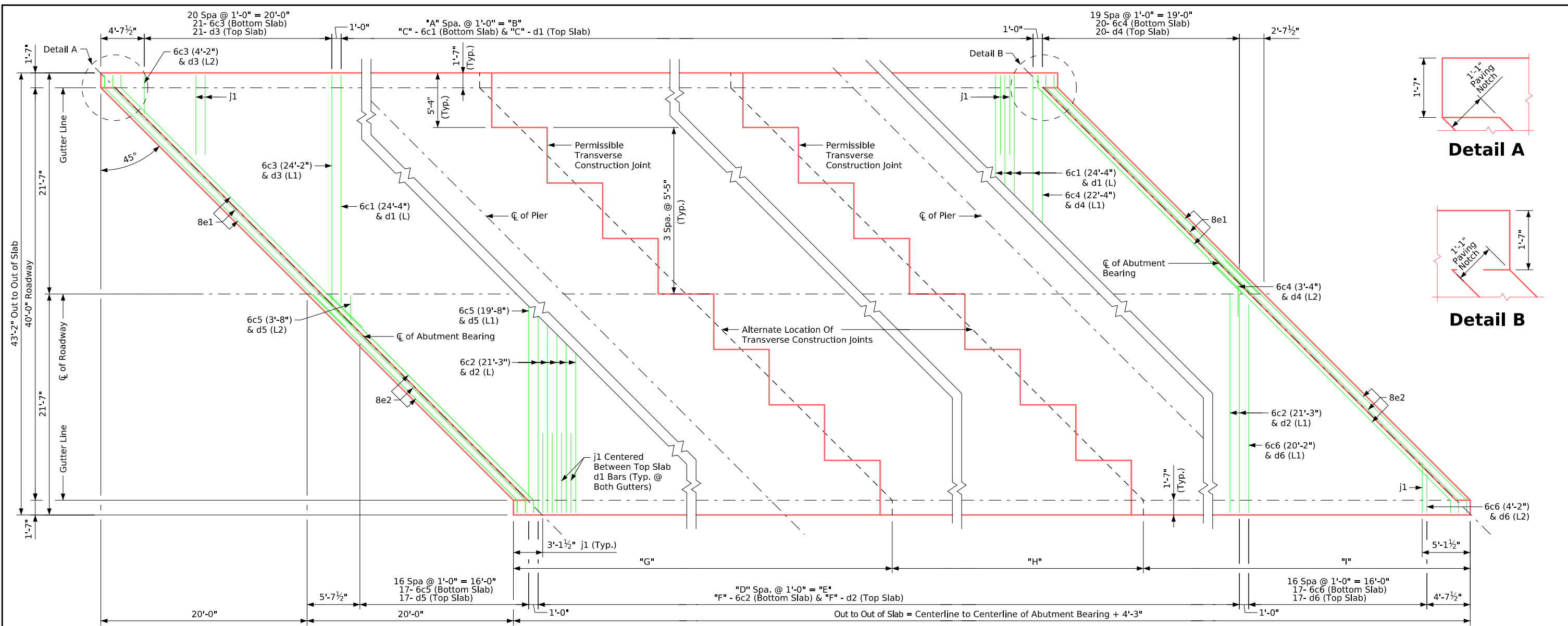
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

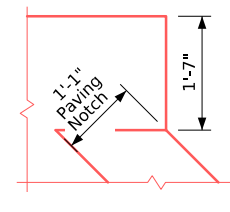
July, 2025

Superstructure Details
30° Skew

J40-23-25



Detail A



Detail B

45° Skew Transverse Reinforcing Steel Layout

j1 Bar Size Table

Bridge Length	Bar Size
70' to 90'	7
100' to 110'	6
120' to 150'	5

45° Transv. Reinf. Dim. Table

Bridge	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
70ft	46	46'-0"	47	50	50'-0"	51	27'-7"	17'-0"	29'-8"
80ft	56	56'-0"	57	60	60'-0"	61	31'-7"	19'-0"	33'-8"
90ft	66	66'-0"	67	70	70'-0"	71	35'-7"	21'-0"	37'-8"
100ft	76	76'-0"	77	80	80'-0"	81	39'-7"	23'-0"	41'-8"
110ft	86	86'-0"	87	90	90'-0"	91	43'-7"	25'-0"	45'-8"
120ft	96	96'-0"	97	100	100'-0"	101	47'-7"	27'-0"	49'-8"
130ft	106	106'-0"	107	110	110'-0"	111	51'-7"	29'-0"	53'-8"
140ft	116	116'-0"	117	120	120'-0"	121	55'-7"	31'-0"	57'-8"
150ft	126	126'-0"	127	130	130'-0"	131	59'-7"	33'-0"	61'-8"

d Bar Size & Length Table

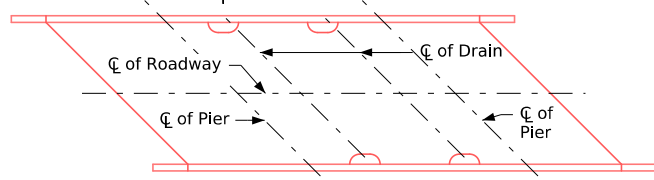
Bridge Length	70'	80' to 150'
Bar Size	6	5
d1(L)	25'-10"	25'-3"
d2(L)	21'-11"	21'-10"
d3(L1)	24'-10"	24'-9"
d3(L2)	4'-10"	4'-9"
d4(L1)	23'-2"	22'-8"
d4(L2)	4'-2"	3'-8"
d5(L1)	19'-8"	19'-8"
d5(L2)	3'-8"	3'-8"
d6(L1)	20'-10"	20'-9"
d6(L2)	4'-10"	4'-9"

(Typical)

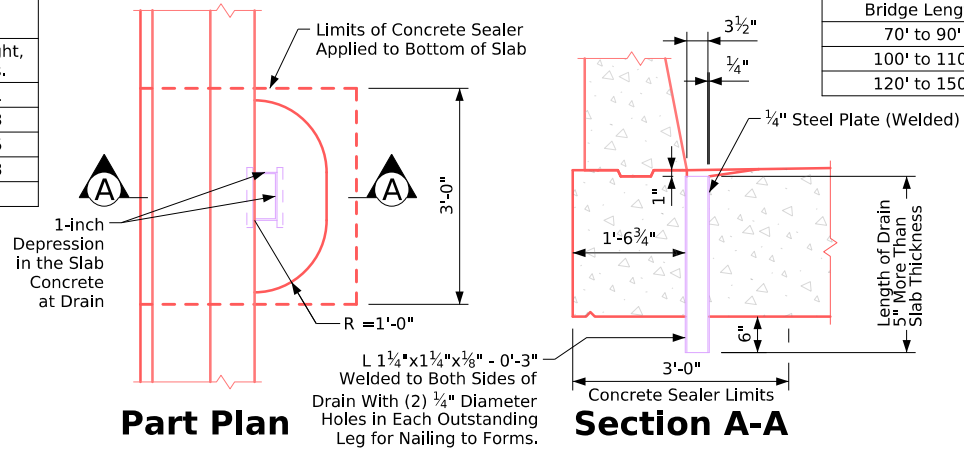
70'-0"	5'-6"
80'-0"	5'-6"
90'-0"	6'-6"
100'-0"	6'-6"
110'-0"	7'-6"
120'-0"	7'-6"
130'-0"	8'-6"
140'-0"	8'-6"
150'-0"	8'-6"

Weight of One Floor Drain

Span	Weight, lbs.	Span	Weight, lbs.
70'-0"	32	120'-0"	41
80'-0"	33	130'-0"	43
90'-0"	35	140'-0"	45
100'-0"	37	150'-0"	48
110'-0"	39		

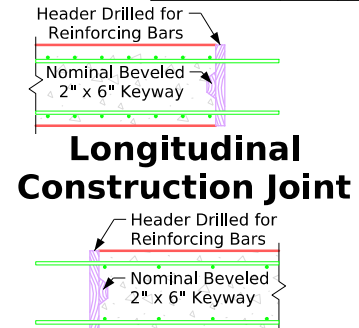


Floor Drain Location



Floor Drain Details

(Use for single slope barrier rail only, not required for open rail.)
 Note: Drains are to be galvanized. Include the cost of drains in the price bid for "Structural Concrete Bridge."
 (4 Drains Required)

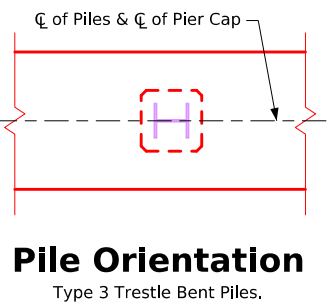
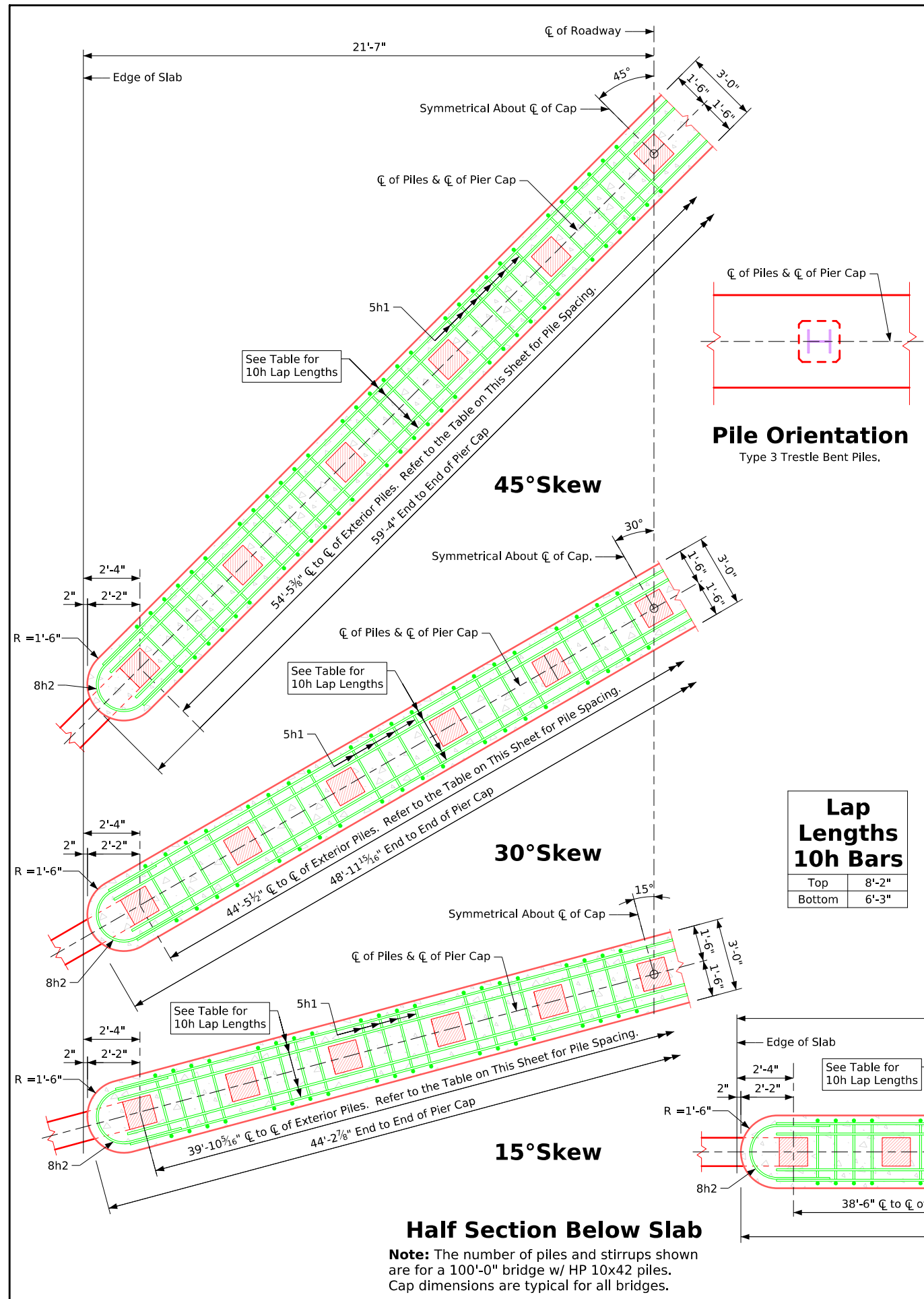


Longitudinal Construction Joint

Transverse Construction Joint

Latest Revision Date
 Approved by Bridge Engineer
[Signature]

IOWA | DOT
 Standard Design-40'-0" Roadway, 3 Span Bridge
Continuous Concrete Slab Bridge
 July, 2025
 Superstructure Details
 45° Skew
J40-24-25



Lap Lengths 10h Bars

Top	8'-2"
Bottom	6'-3"

***Factored Loads And Number Of Piles Monolithic - 40' Roadway**

Bridge Length	Pu (kips)	HP 10 x 42				HP 10 x 57				HP 12 x 53				HP 14 x 73				HP 14 x 89							
		Number of Piles				Number of Piles				Number of Piles				Number of Piles				Number of Piles							
		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°				
70'-0"	856	8	8	8	8	855	6	6	7	8	881	7	7	7	8	928	6	6	7	8	927	6	6	7	8
80'-0"	950	9	9	9	9	942	7	7	7	8	968	8	8	8	8	1014	6	6	7	8	1014	6	6	7	8
90'-0"	1055	10	10	10	10	1040	8	8	8	8	1066	8	8	8	8	1113	6	6	7	8	1112	6	6	7	8
100'-0"	1170	11	11	11	11	1148	8	8	8	8	1184	9	9	9	9	1220	7	7	7	8	1219	6	6	7	8
110'-0"	1282	12	12	12	12	1259	9	9	9	9	1299	10	10	10	10	1325	8	8	8	8	1324	6	6	7	8
120'-0"	1420	14	14	14	14	1391	10	10	10	10	1433	11	11	11	11	1449	8	8	8	8	1449	7	7	7	8
130'-0"	1550	15	15	15	15	1521	11	11	11	11	1567	12	12	12	12	1588	9	9	9	9	1571	7	7	7	8
140'-0"	1686	16	16	16	16	1656	12	12	12	12	1705	13	13	13	13	1733	10	10	10	10	1700	8	8	8	8
150'-0"	1844	N.A	N.A	17	18	1807	13	13	13	13	1859	14	14	14	14	1893	11	11	11	11	1860	9	9	9	9

***Factored Loads And Number Of Piles Monolithic - 40' Roadway**

Bridge Length	Pu (kips)	Prestressed 14"				Prestressed 16"				Cast In Place 14"				Cast In Place 16"											
		Number of Piles				Number of Piles				Number of Piles				Number of Piles											
		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°								
70'-0"	901	10	10	10	10	919	9	9	9	9	891	10	10	10	10	906	9	9	9	9	906	9	9	9	9
80'-0"	998	11	11	11	11	1019	10	10	10	10	987	11	11	11	11	1005	9	9	9	10	10	10	10	10	
90'-0"	1107	12	12	12	12	1130	11	11	11	11	1095	12	12	12	12	1115	10	10	11	11	1115	10	10	11	11
100'-0"	1224	13	13	13	13	1251	12	12	12	12	1212	13	13	13	13	1235	12	12	12	12	1235	12	12	12	12
110'-0"	1349	14	14	14	15	1369	N.A	N.A	13	13	1325	14	14	14	14	1351	N.A	N.A	13	13	1351	N.A	N.A	13	13
120'-0"	1484	N.A	N.A	16	16	1507	N.A	N.A	14	14	1468	N.A	N.A	16	16	1488	N.A	N.A	14	14	1488	N.A	N.A	14	14
130'-0"	1617	N.A	N.A	N.A	17	1656	N.A	N.A	N.A	16	1601	N.A	N.A	17	1622	N.A	N.A	N.A	15	1622	N.A	N.A	N.A	15	15
140'-0"	1766	N.A	N.A	N.A	19	1798	N.A	N.A	N.A	17	1747	N.A	N.A	N.A	1775	N.A	N.A	N.A	17	1775	N.A	N.A	N.A	17	17
150'-0"	1930	N.A	N.A	N.A	N.A	1955	N.A	N.A	N.A	N.A	1900	N.A	N.A	N.A	N.A	1930	N.A	N.A	N.A	N.A	1930	N.A	N.A	N.A	N.A

N.A. indicates the pile spacing for this pile size does not satisfy the maximum or minimum spacing requirements.
 *Pu is Strength 1 Pier Design load which includes factored dead and live loads including dynamic load allowance (IM) pier cap weight based on 45° skew, and weight of pile encasement.

Pile Spacing - Monolithic - 40' Roadway Width

No. Piles	No. Spaces	0° Skew	15° Skew	30° Skew	45° Skew
6	5	7'-8"	8'-0"	N.A.	N.A.
7	6	6'-5"	6'-8"	7'-5"	N.A.
8	7	5'-6"	5'-8"	6'-4"	7'-9"
9	8	4'-10"	5'-0"	5'-7"	6'-10"
10	9	4'-3"	4'-5"	4'-11"	6'-1"
11	10	3'-10"	4'-0"	4'-5"	5'-5"
12	11	3'-6"	3'-7"	4'-0"	4'-11"
13	12	3'-2"	3'-4"	3'-8"	4'-6"
14	13	3'-0"	3'-1"	3'-5"	4'-2"
15	14	2'-9"	2'-10"	3'-2"	3'-11"
16	15	2'-7"	2'-8"	3'-0"	3'-8"
17	16	N.A.	N.A.	2'-9"	3'-5"
18	17	N.A.	N.A.	2'-7"	3'-2"
19	18	N.A.	N.A.	N.A.	3'-0"

N.A. indicates the pile spacing for this pile size cannot satisfy for the limits of the maximum or minimum spacing requirements.

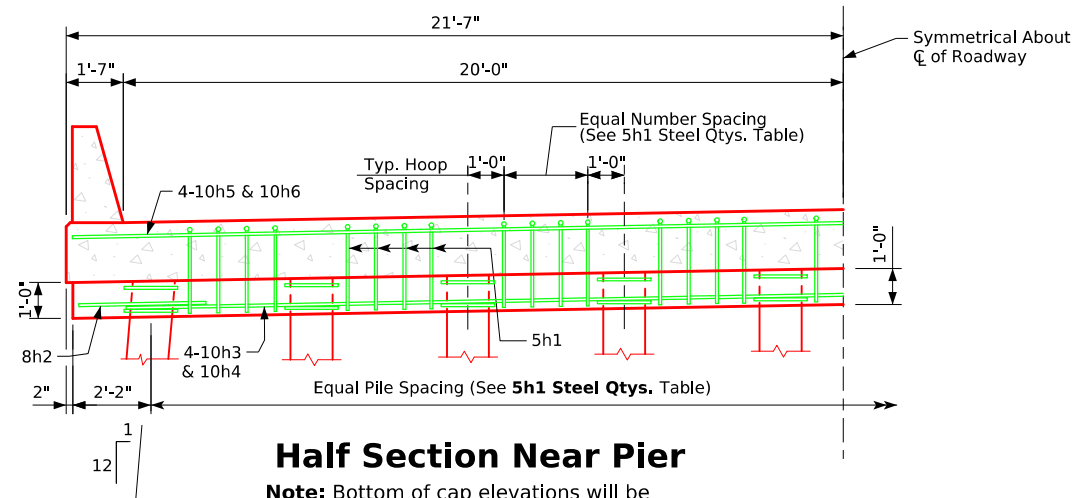
Pier Notes:

The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2" unless otherwise noted or shown.
 Pier piles are to be driven to full penetration, if practicable, but in no case to a bearing value less than the pile bearing required for each bridge length as shown in plans. Additional driving capacity may be required through scourable layers. For General Plan Notes for additional information, Sheet **J40-01-25**.
 Cap steel, as detailed on the P10L Standard Pile Drawing, is required for monolithic pier caps.
 Concrete quantities are based on the use of Type 3 piling. If Type 1 or Type 2 is used, concrete quantities may be adjusted to account for the concrete displaced by the piling.
 All reinforcing steel is to be Grade 60.
 Pier piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. of future wearing surface.

Note:

For Monolithic Pier Cap Details And Quantities, See Sheet **J40-26-25**.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Pier Cap Monolithic Details All Bridges (1 of 2)		J40-25-25



Half Section Near Pier
Note: Bottom of cap elevations will be required at the centerline of the roadway and at each exterior pile.

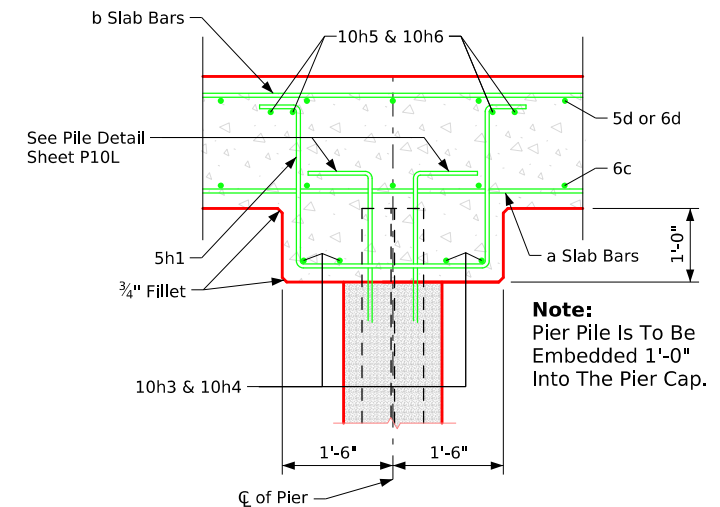
Note:
 * Total weight shall be calculated by the Designer based on the type/size of piling used and the size of the bridge.

5h1 Steel Quantities - Monolithic Pier Cap - One Pier 40' Roadway Width

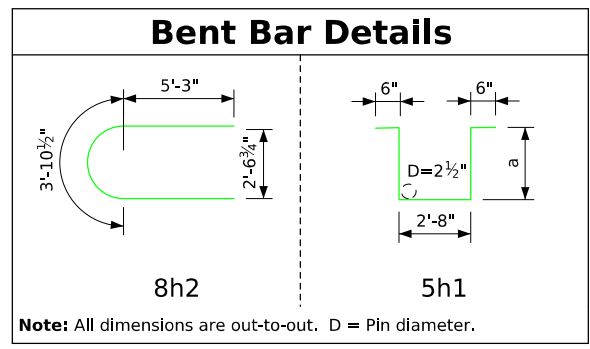
No. Piles	No. Pile Spaces	5h1 Shape	5h1 Length (ft)	0° Skew		15° Skew		30° Skew		45° Skew	
				No. Eq. Hoop Spaces	Total No. Hoops	No. Eq. Hoop Spaces	Total No. Hoops	No. Eq. Hoop Spaces	Total No. Hoops	No. Eq. Hoop Spaces	Total No. Hoops
7	6			5	36	5	36	6	42	N.A	N.A
8	7			4	35	4	35	5	42	6	49
9	8			3	32	3	32	4	40	5	48
10	9			3	36	3	36	3	36	5	54
11	10			2	30	2	30	3	40	4	50
12	11			2	33	2	33	3	44	3	44
13	12			2	36	2	36	2	36	3	48
14	13			1	26	2	39	2	39	3	52
15	14			1	28	1	28	2	42	2	42
16	15			1	30	1	30	1	30	2	45
17	16			N.A	N.A	N.A	N.A	1	32	2	48
18	17			N.A	N.A	N.A	N.A	1	34	2	51
19	18			N.A	N.A	N.A	N.A	1	36	2	52

Epoxy Reinforcing Steel - Monolithic 40' Roadway - One Pier

Epoxy Reinforcing Steel - Monolithic - 40' Roadway - One Pier													
Bar	Shape	No.	0° Skew			15° Skew			30° Skew			45° Skew	
			Length	Weight	No.	Length	Weight	No.	Length	Weight	Length	No.	Weight
8h2		2	14'-5"	77	2	14'-5"	77	2	14'-5"	77	14'-5"	2	77
10h3		4	19'-11"	343	4	20'-7"	354	4	23'-0"	396	28'-2"	4	485
10h4		4	26'-2"	450	4	26'-10"	462	4	29'-3"	503	34'-2"	4	588
10h5		4	21'-5"	369	4	21'-10"	376	4	23'-11"	412	28'-8"	4	493
10h6		4	29'-7"	509	4	30'-0"	516	4	32'-1"	552	36'-10"	4	634



TYPICAL CAP SECTION



5h1 bar Lengths

Bridge Length	a Dimension	Length	Wt/bar (lbs)
70'-0"	1'-7 1/2"	6'-11"	7
80'-0"	1'-8 3/4"	7'-1"	7
90'-0"	1'-9 1/4"	7'-3"	8
100'-0"	1'-10 1/4"	7'-5"	8
110'-0"	2'-0 1/4"	7'-9"	8
120'-0"	2'-1"	7'-10"	8
130'-0"	2'-2 1/4"	8'-1"	8
140'-0"	2'-3 1/2"	8'-3"	9
150'-0"	2'-5"	8'-6"	9

Est. Concrete Qty - Monolithic One Pier 40' Roadway Width

Skew	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
0°	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
15°	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
30°	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
45°	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Note:
 For Pile Spacing, See Sheet J40-25-25.

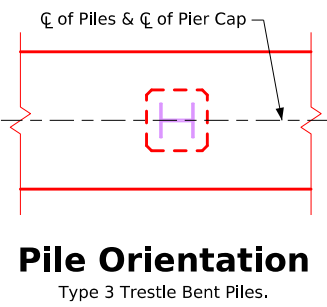
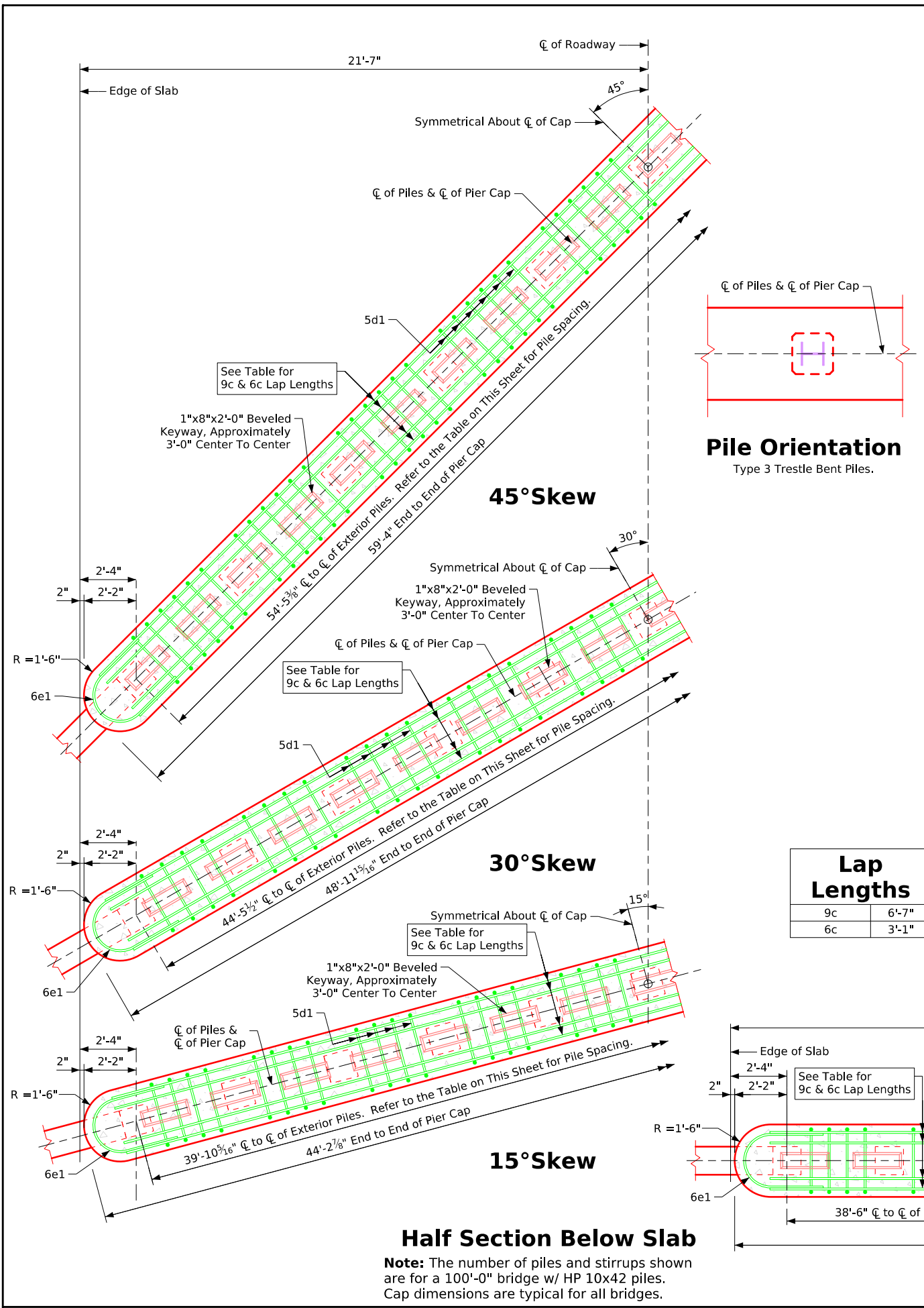
Latest Revision Date
 Approved by Bridge Engineer



Standard Design-40'-0" Roadway, 3 Span Bridge
Continuous Concrete Slab Bridge
 July, 2025

Pier Cap Monolithic Details All Bridges (2 of 2)

J40-26-25



Lap Lengths	
9c	6'-7"
6c	3'-1"

*Factored Loads And Number Of Piles - Non-Monolithic 40' Roadway

Bridge Length	Pu (kips)	HP 10 x 42				HP 10 x 57				HP 12 x 53				HP 14 x 73				HP 14 x 89							
		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°				
70'-0	941	9	9	9	9	934	7	7	7	8	959	7	7	7	8	1006	6	6	7	8	1005	6	6	7	8
80'-0	1035	10	10	10	10	1020	7	7	7	8	1046	8	8	8	8	1093	6	6	7	8	1092	6	6	7	8
90'-0	1141	11	11	11	11	1119	8	8	8	8	1155	9	9	9	9	1191	7	7	7	8	1191	6	6	7	8
100'-0	1255	12	12	12	12	1233	9	9	9	9	1273	10	10	10	10	1299	7	7	7	8	1298	6	6	7	8
110'-0	1367	13	13	13	13	1345	9	9	10	10	1387	11	11	11	11	1403	8	8	8	8	1403	6	6	7	8
120'-0	1499	14	14	14	14	1476	10	10	10	11	1522	12	12	12	12	1544	9	9	9	9	1527	7	7	7	8
130'-0	1636	15	15	15	16	1599	11	11	11	11	1655	13	13	13	13	1667	9	9	9	9	1650	8	8	8	8
140'-0	1771	N.A	N.A	17	17	1735	12	12	12	12	1794	14	14	14	14	1811	10	10	10	10	1778	8	8	8	8
150'-0	1922	N.A	N.A	18	18	1885	13	13	13	13	1948	15	15	15	15	1971	11	11	11	11	1938	9	9	9	9

*Factored Loads And Number Of Piles - Non-Monolithic 40' Roadway

Bridge Length	Pu (kips)	Prestressed 14"				Prestressed 16"				Cast In Place 14"				Cast In Place 16"										
		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°							
70'-0	990	10	10	11	11	1010	9	9	9	10	979	10	10	10	11	985	9	9	9	9				
80'-0	1087	11	12	12	12	1110	10	10	10	11	1075	11	11	11	12	1083	10	10	10	10				
90'-0	1195	13	13	13	13	1222	11	11	11	12	1183	12	13	13	13	1194	11	11	11	11				
100'-0	1313	14	14	14	14	1343	12	12	12	13	1299	14	14	14	14	1313	12	12	12	12				
110'-0	1428	N.A	N.A	15	15	1461	N.A	N.A	14	14	1413	N.A	N.A	15	15	1442	N.A	N.A	13	14				
120'-0	1572	N.A	N.A	N.A	17	1598	N.A	N.A	N.A	15	1556	N.A	N.A	N.A	17	1578	N.A	N.A	N.A	15				
130'-0	1706	N.A	N.A	N.A	18	1735	N.A	N.A	N.A	16	1688	N.A	N.A	N.A	18	1713	N.A	N.A	N.A	16				
140'-0	1854	N.A	N.A	N.A	N.A	1890	N.A	N.A	N.A	N.A	1835	N.A	N.A	N.A	N.A	1853	N.A	N.A	N.A	17				
150'-0	2018	N.A	N.A	N.A	N.A	2047	N.A	N.A	N.A	N.A	1988	N.A	N.A	N.A	N.A	2021	N.A	N.A	N.A	N.A				

N.A. indicates the pile spacing for this pile size does not satisfy the maximum or minimum spacing requirements.
 *Pu is Strength 1 Pier Design load which includes factored dead and live loads including dynamic load allowance (IM) pier cap weight based on 45° skew, and weight of pile encasement.

Pile Spacing - Monolithic - 40' Roadway Width

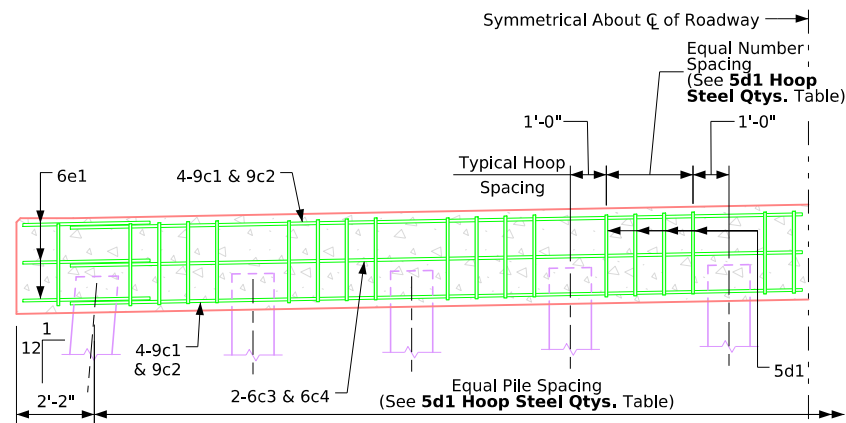
No. Piles	No. Spaces	0° Skew	15° Skew	30° Skew	45° Skew
6	5	7'-8"	8'-0"	N.A.	N.A.
7	6	6'-5"	6'-8"	7'-5"	N.A.
8	7	5'-6"	5'-8"	6'-4"	7'-9"
9	8	4'-10"	5'-0"	5'-7"	6'-10"
10	9	4'-3"	4'-5"	4'-11"	6'-1"
11	10	3'-10"	4'-0"	4'-5"	5'-5"
12	11	3'-6"	3'-7"	4'-0"	4'-11"
13	12	3'-2"	3'-4"	3'-8"	4'-6"
14	13	3'-0"	3'-1"	3'-5"	4'-2"
15	14	2'-9"	2'-10"	3'-2"	3'-11"
16	15	2'-7"	2'-8"	3'-0"	3'-8"
17	16	N.A.	N.A.	2'-9"	3'-5"
18	17	N.A.	N.A.	2'-7"	3'-2"
19	18	N.A.	N.A.	N.A.	3'-0"

N.A. indicates the pile spacing for this pile size cannot satisfy for the limits of the maximum or minimum spacing requirements.

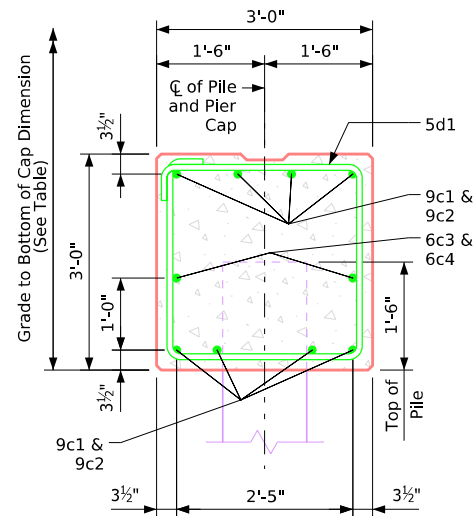
Pier Notes:
 For skewed bridges, the bottom of the pier cap is to be sloped to compensate for grade. Therefore, bottom-of-cap elevations will be required at the centerline of the roadway and at each exterior pile.
 The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted or shown.
 Pier piles are to be driven to full penetration if practicable but, in no case, to a bearing value less than the pile bearing required for each bridge.
 Concrete quantities are based on the use of Type 3 piling. If Type 1 or Type 2 is used, concrete quantities may be adjusted to account for the displacement caused by the piling.
 All reinforcing steel is to be Grade 60.
 Pier piling was designed for HL-93 loading with an allowance for a 20 lbs. per sq. ft. future wearing surface.

Note:
 For Non-Monolithic Pier Cap Details And Quantities, See Sheet **J40-28-25**.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Pier Cap Non-Monolithic Details All Bridges (1 of 2)	J40-27-25



Typ. Half Elevation Pier Cap
(Looking Parallel to \bar{C} Roadway)



Typical Section

5d1 Hoop Steel Quantities - Non-Monolithic Pier Cap One Pier - 40' Roadway Width

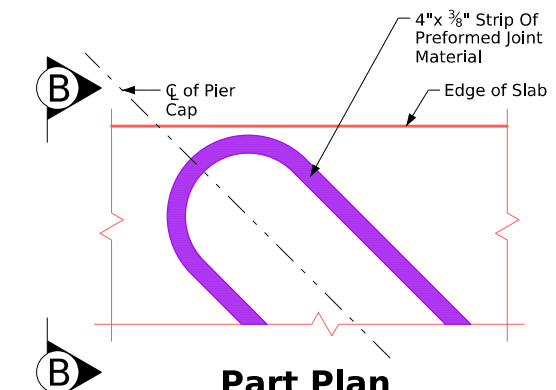
No. Piles	No. Pile Spaces	5d1 Hoop Shape	5d1 Hoop Length (ft)	0° Skew			15° Skew			30° Skew			45° Skew		
				No. Eq. Hoop Spaces	Total No. Hoops	Total Weight (lbs)	No. Eq. Hoop Spaces	Total No. Hoops	Total Weight (lbs)	No. Eq. Hoop Spaces	Total No. Hoops	Total Weight (lbs)	No. Eq. Hoop Spaces	Total No. Hoops	Total Weight (lbs)
7	6	□	11'-8"	5	36	438	5	36	438	6	42	511	N.A	N.A	N.A
8	7	□	11'-8"	4	35	426	4	35	426	5	42	511	6	49	596
9	8	□	11'-8"	3	32	389	3	32	389	4	40	487	5	48	584
10	9	□	11'-8"	3	36	438	3	36	438	3	36	438	5	54	657
11	10	□	11'-8"	2	30	365	2	30	365	3	40	487	4	50	609
12	11	□	11'-8"	2	33	402	2	33	402	3	44	536	3	44	536
13	12	□	11'-8"	2	36	438	2	36	438	2	36	438	3	48	584
14	13	□	11'-8"	1	26	316	2	39	475	2	39	475	3	52	633
15	14	□	11'-8"	1	28	341	1	28	341	2	42	511	2	42	511
16	15	□	11'-8"	1	30	365	1	30	365	1	30	365	2	45	548
17	16	□	11'-8"	N.A	N.A	N.A	N.A	N.A	N.A	1	32	389	2	48	584
18	17	□	11'-8"	N.A	N.A	N.A	N.A	N.A	N.A	1	34	414	2	51	621
19	18	□	11'-8"	N.A	N.A	N.A	N.A	N.A	N.A	1	36	439	2	52	633

Bridge Grade to Bottom of Cap Dimension

70'- Bridge	4'-9 $\frac{5}{16}$ "
80'- Bridge	4'-9 $\frac{15}{16}$ "
90'- Bridge	4'-10 $\frac{1}{16}$ "
100'- Bridge	5'-0 $\frac{5}{16}$ "
110'- Bridge	5'-1 $\frac{1}{16}$ "
120'- Bridge	5'-2 $\frac{1}{16}$ "
130'- Bridge	5'-3 $\frac{1}{16}$ "
140'- Bridge	5'-5 $\frac{5}{16}$ "
150'- Bridge	5'-6 $\frac{1}{16}$ "

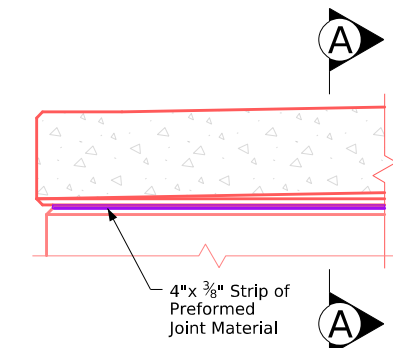
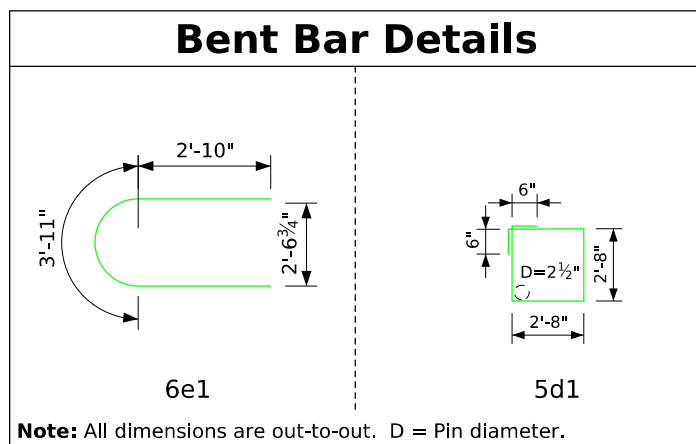
Epoxy Reinforcing Steel - Non-Monolithic 40' Roadway - One Pier

Epoxy Reinforcing Steel - Non-Monolithic - 40' Roadway - One Pier														
Bar	Shape	No.	0° Skew			15° Skew			30° Skew			45° Skew		
			Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	
9c1	—	8	19'-11"	542	8	20'-7"	561	8	23'-0"	626	8	28'-2"	766	
9c2	—	8	26'-7"	723	8	27'-3"	742	8	29'-8"	807	8	35'-0"	952	
6c3	—	2	19'-11"	60	2	20'-7"	62	2	23'-0"	69	2	28'-2"	85	
6c4	—	2	23'-2"	70	2	23'-10"	72	2	26'-4"	79	2	31'-6"	95	
6e1	□	6	9'-7"	86	6	9'-7"	86	6	9'-7"	86	6	9'-7"	86	

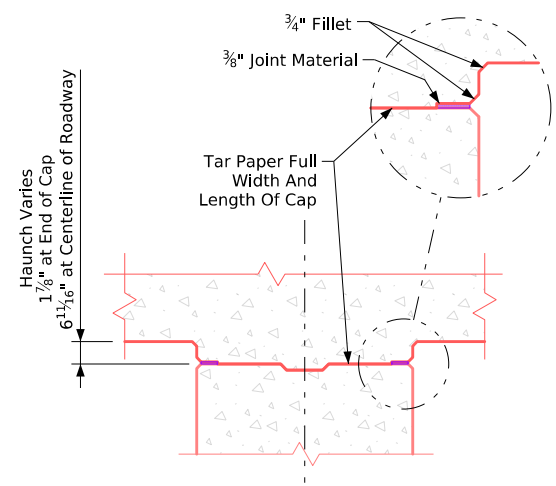


Part Plan

Showing treatment of 4" x $\frac{3}{8}$ " strip of preformed joint material at ends of pier cap. Note that joint material is to go all the way around pier cap for square and skewed bridges.



Part Section B-B



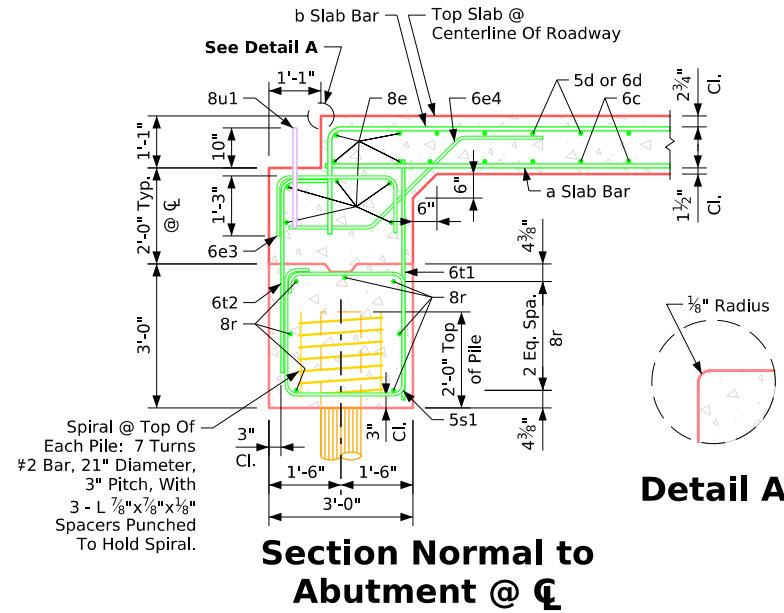
Part Section A-A

Note: For Pile Spacing, See Sheet J40-27-25.

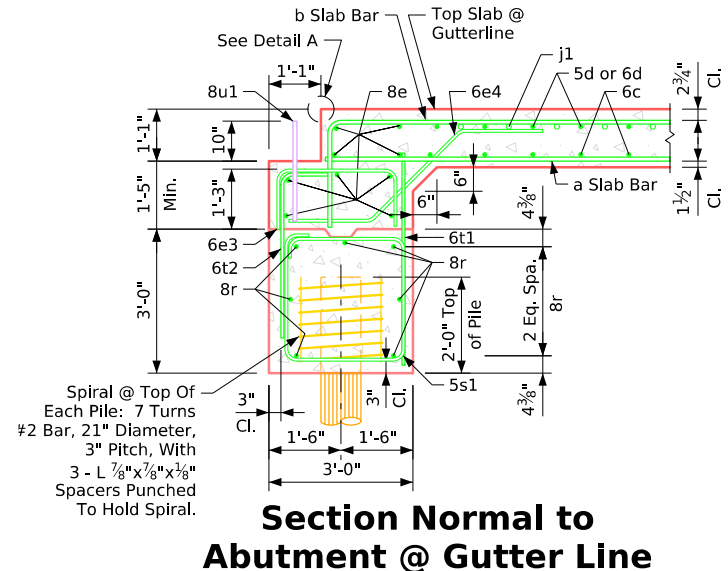
Est. Concrete Qty - Non-Monolithic One Pier 40' Roadway Width

Skew	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
0°	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
15°	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
30°	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
45°	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6

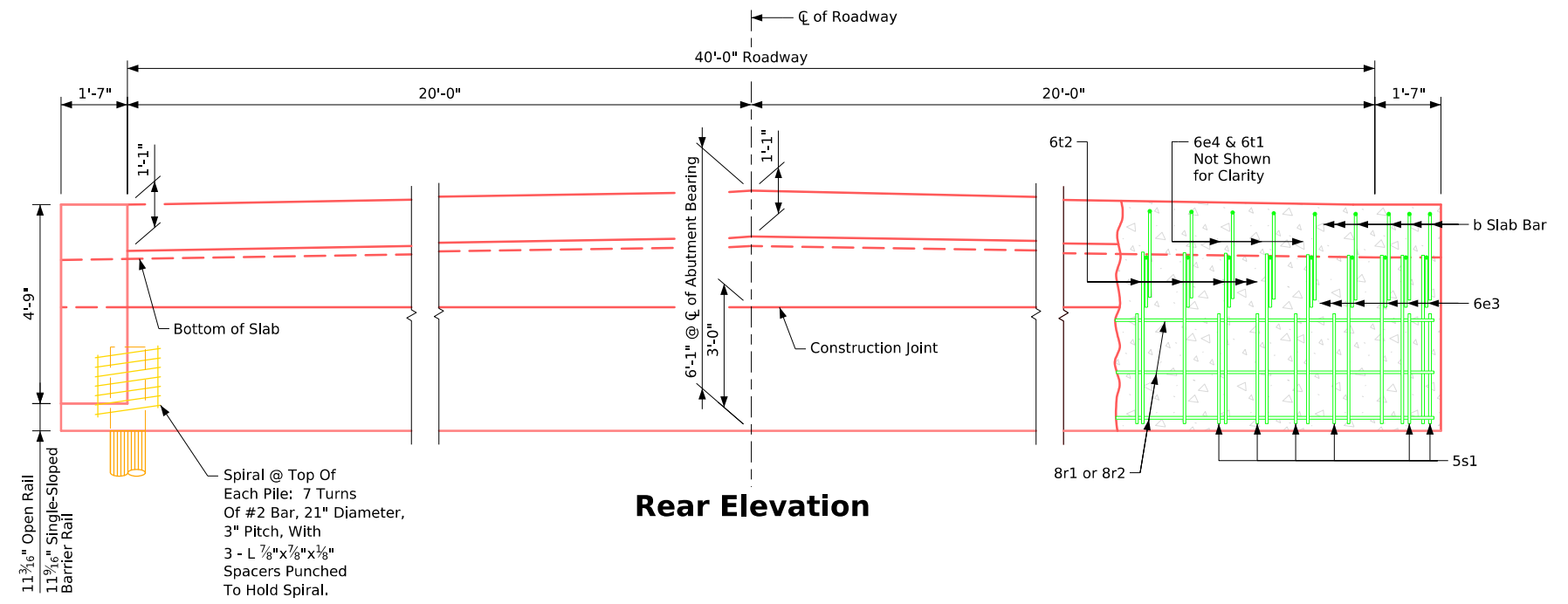
Latest Revision Date Approved by Bridge Engineer 	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge
	Continuous Concrete Slab Bridge
	July, 2025
Pier Cap Non-Monolithic Details All Bridges (2 of 2)	J40-28-25



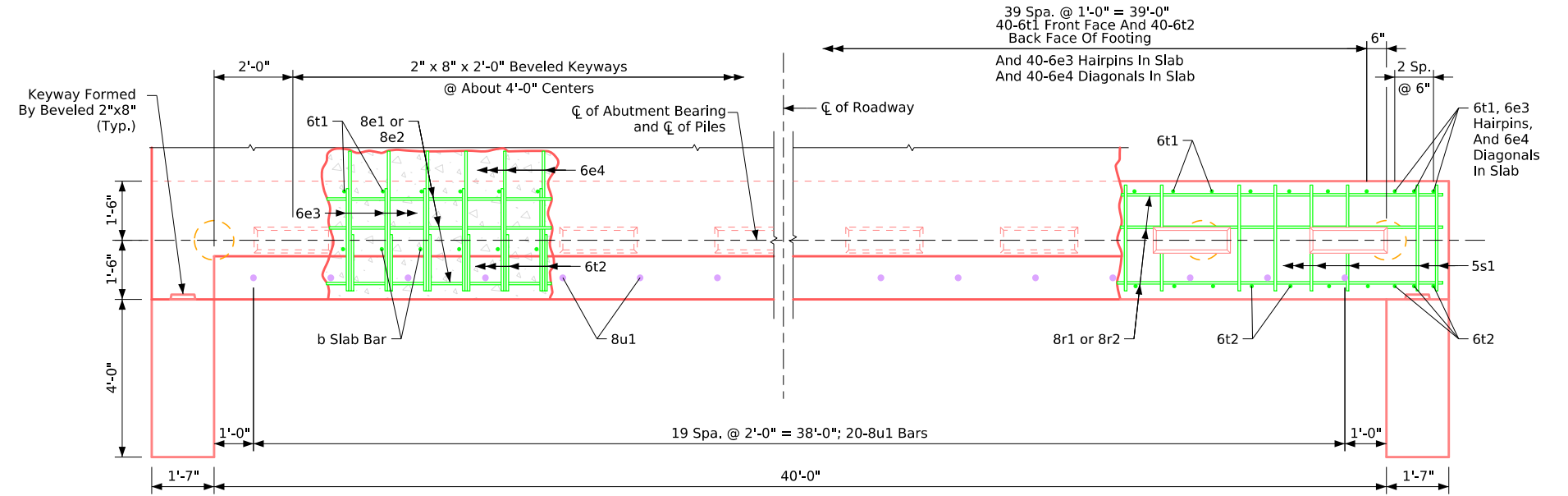
Section Normal to Abutment @ C.L.



Section Normal to Abutment @ Gutter Line



Rear Elevation




Plan View

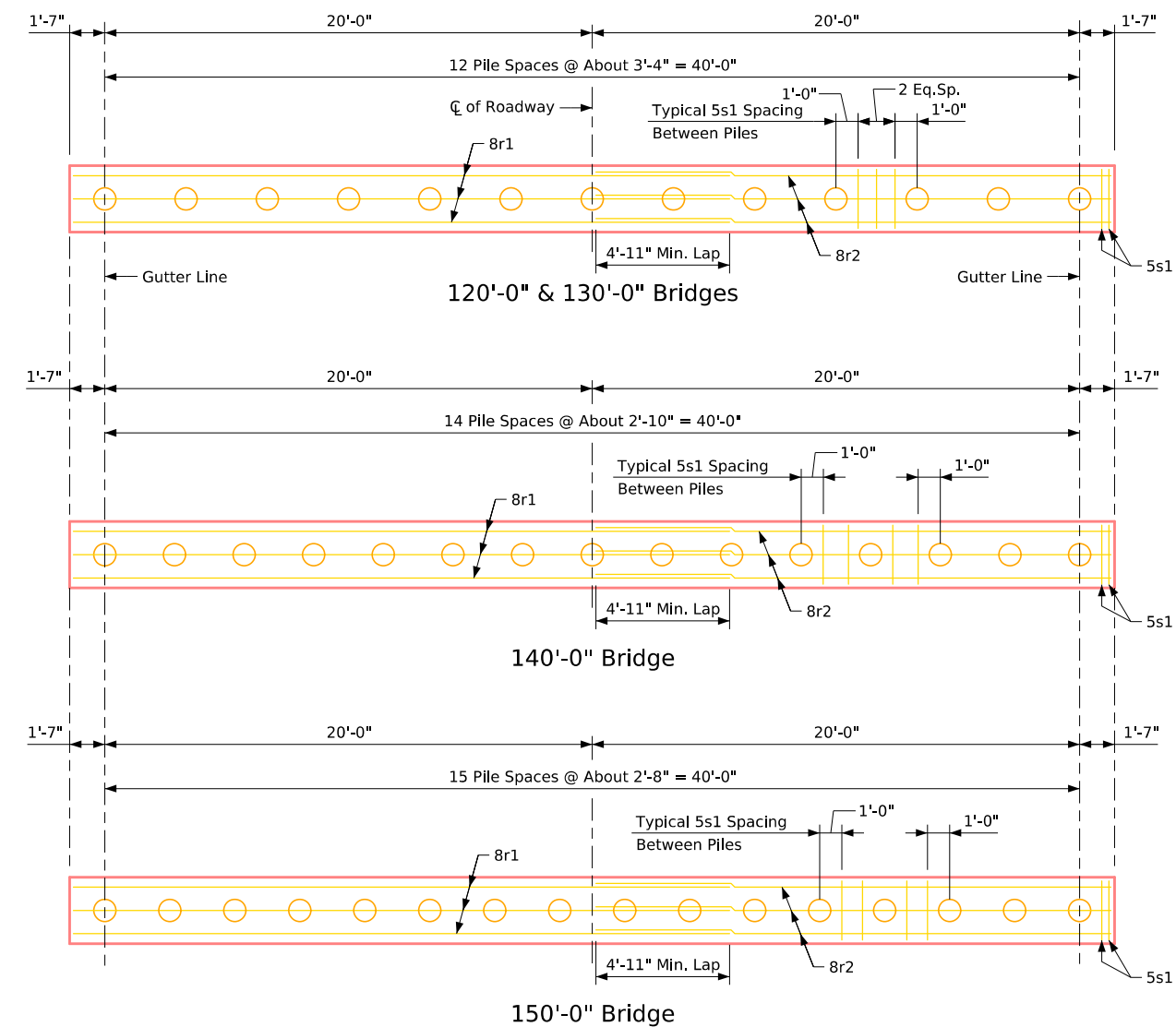
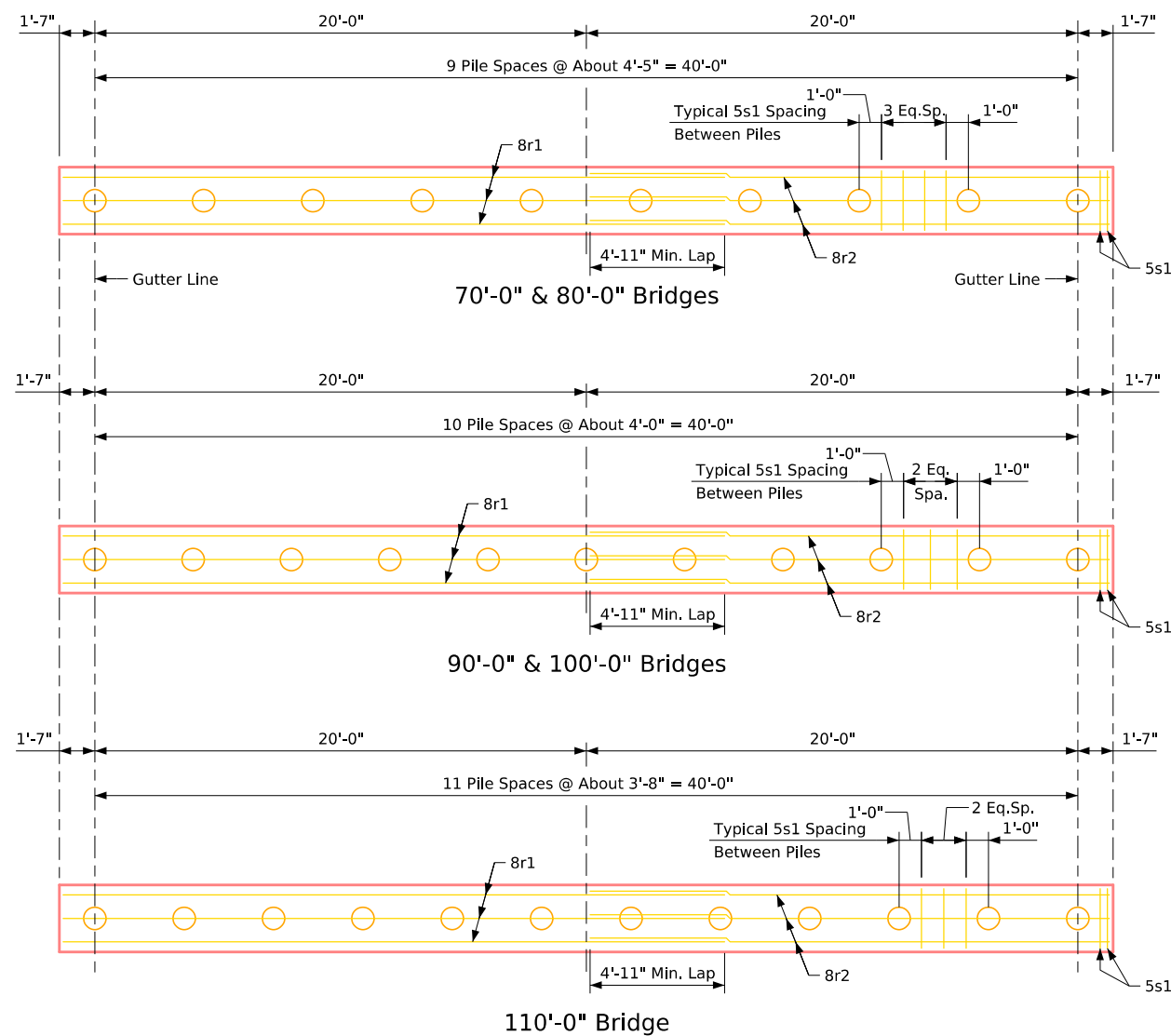
ABUTMENT NOTES:

- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet apply only when abutments are placed on timber piles.
- The minimum clear distance from the face of the concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown.
- Timber piles shall be driven to full penetration if practicable, but in no case to a bearing value less than specified in the design plans. Timber piles shall not be driven to more than 160 tons.
- All reinforcing steel shall be Grade 60.
- Abutment piling was designed for HL-93 loading with an allowance for a 20 lbs. per sq. ft. future wearing surface.

NOTES:

- Barrier rails and reinforcement not shown.
- Wing reinforcing not shown.
- 5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
- 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge July, 2025	
	Abutment Details 0° Skew - Timber Piling (1 of 2)	J40-29-25




**Pile Plan - 0° Skew
Timber Piling**

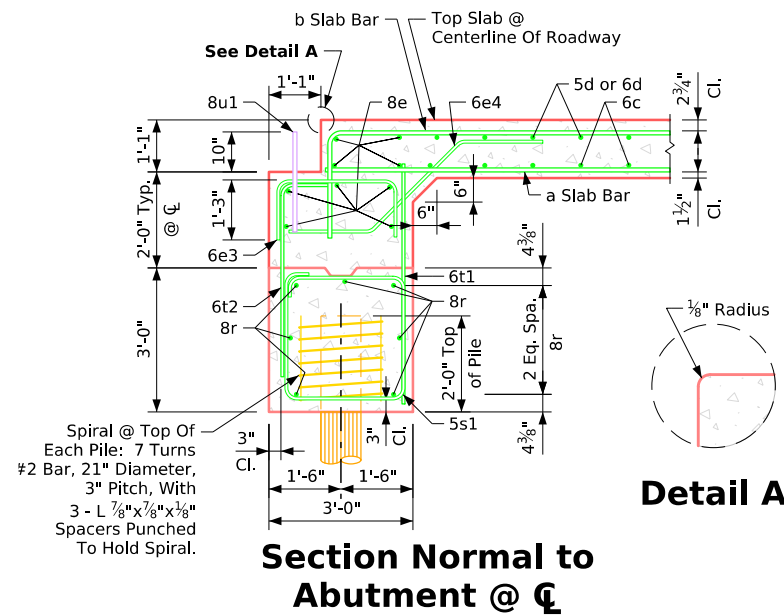
Number of Piles and Abutment Design Loads

Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	10	10	11	11	12	13	13	15	16
Pu, Strength 1 Design Load - kips	483	515	546	585	623	666	708	Δ830	Δ879

Δ Includes dynamic load allowance

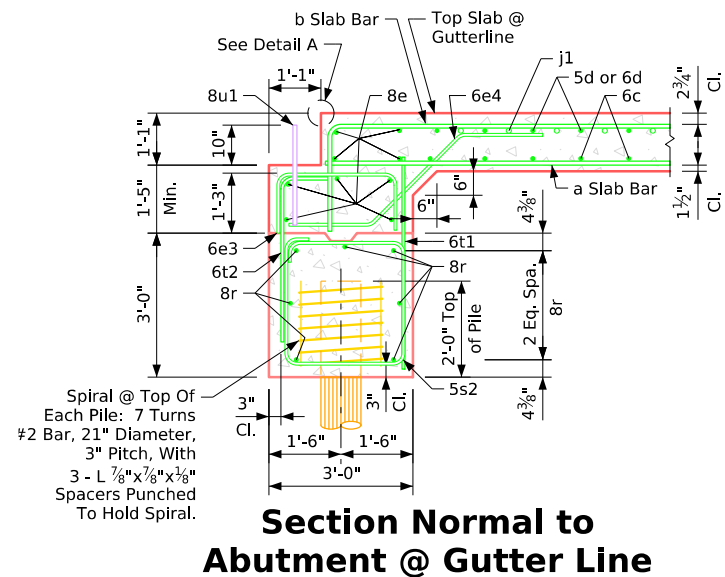
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date	 Approved by Bridge Engineer	IOWA DOT	
		Standard Design-40'-0" Roadway, 3 Span Bridge	
		Continuous Concrete Slab Bridge	
		July, 2025	
		Abutment Details 0° Skew - Timber Piling (2 of 2)	J40-30-25



Detail A

Section Normal to Abutment @ \mathcal{C}



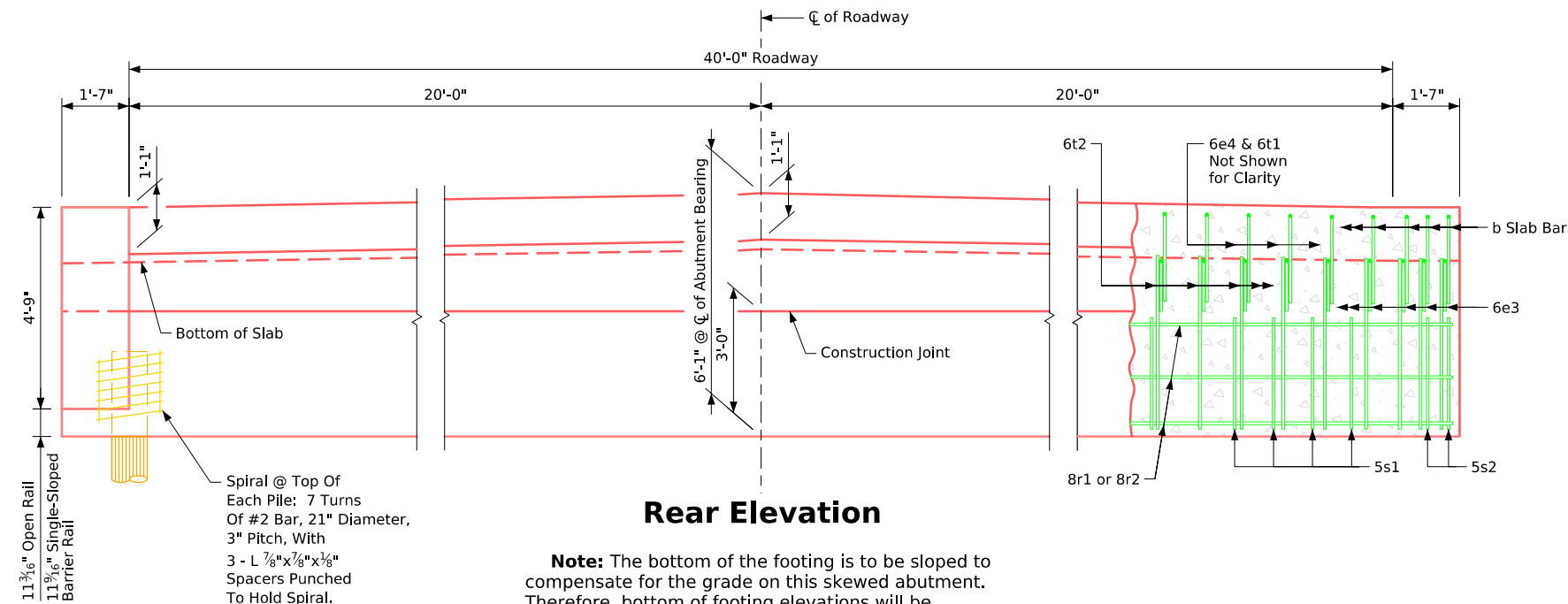
Section Normal to Abutment @ Gutter Line

ABUTMENT NOTES:

The concrete and reinforcing steel for the wings is included with the superstructure.
 Details on this sheet apply only when abutments are placed on timber piles.
 The minimum clear distance from the face of the concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown.
 Timber piles shall be driven to full penetration if practicable, but in no case to a bearing value less than specified in the design plans. Timber piles shall not be driven to more than 160 tons.
 All reinforcing steel shall be Grade 60.
 Abutment piling was designed for HL-93 loading with an allowance for a 20 lbs. per sq. ft. future wearing surface.

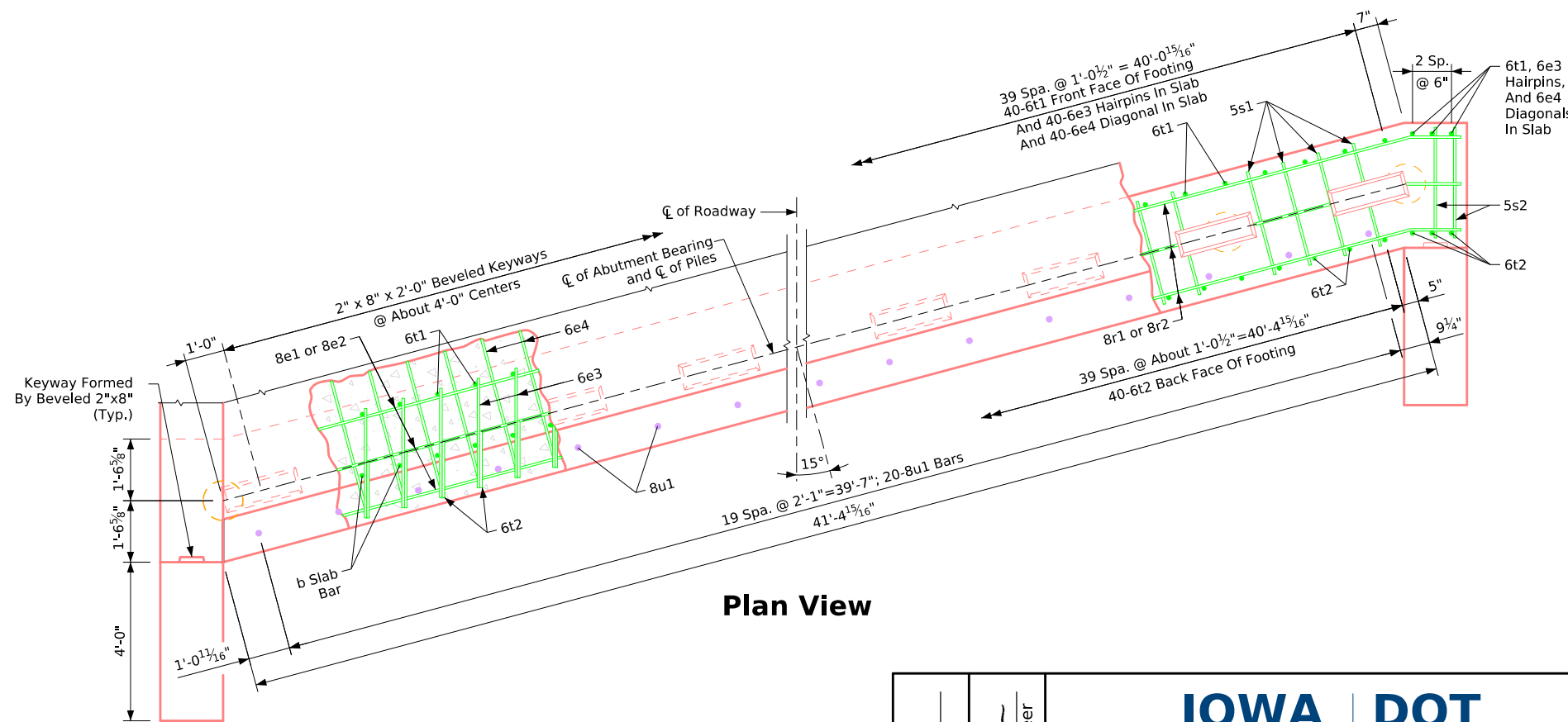
NOTES:

Barrier rails and reinforcement not shown.
 Wing reinforcing not shown.
 5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.




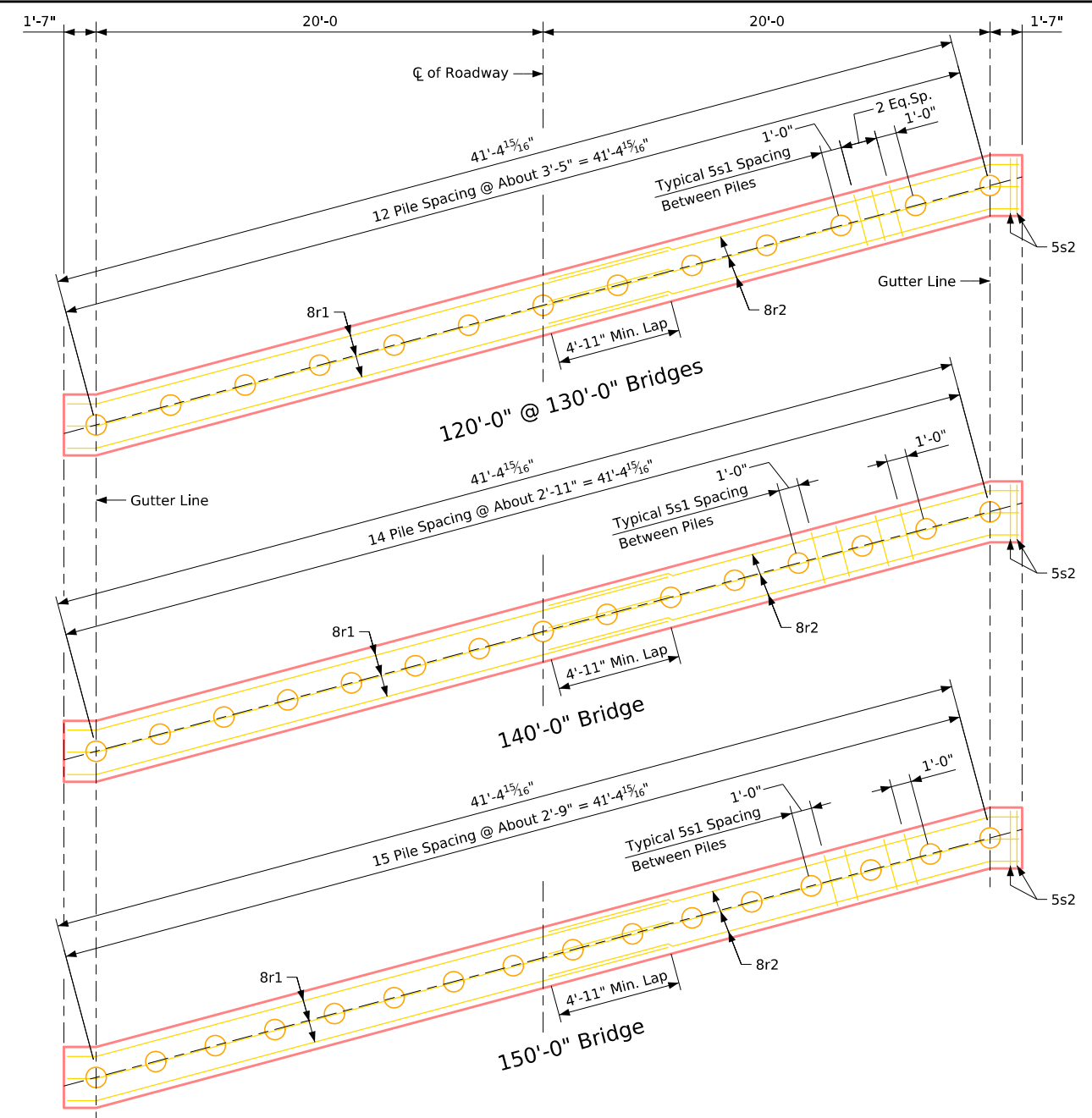
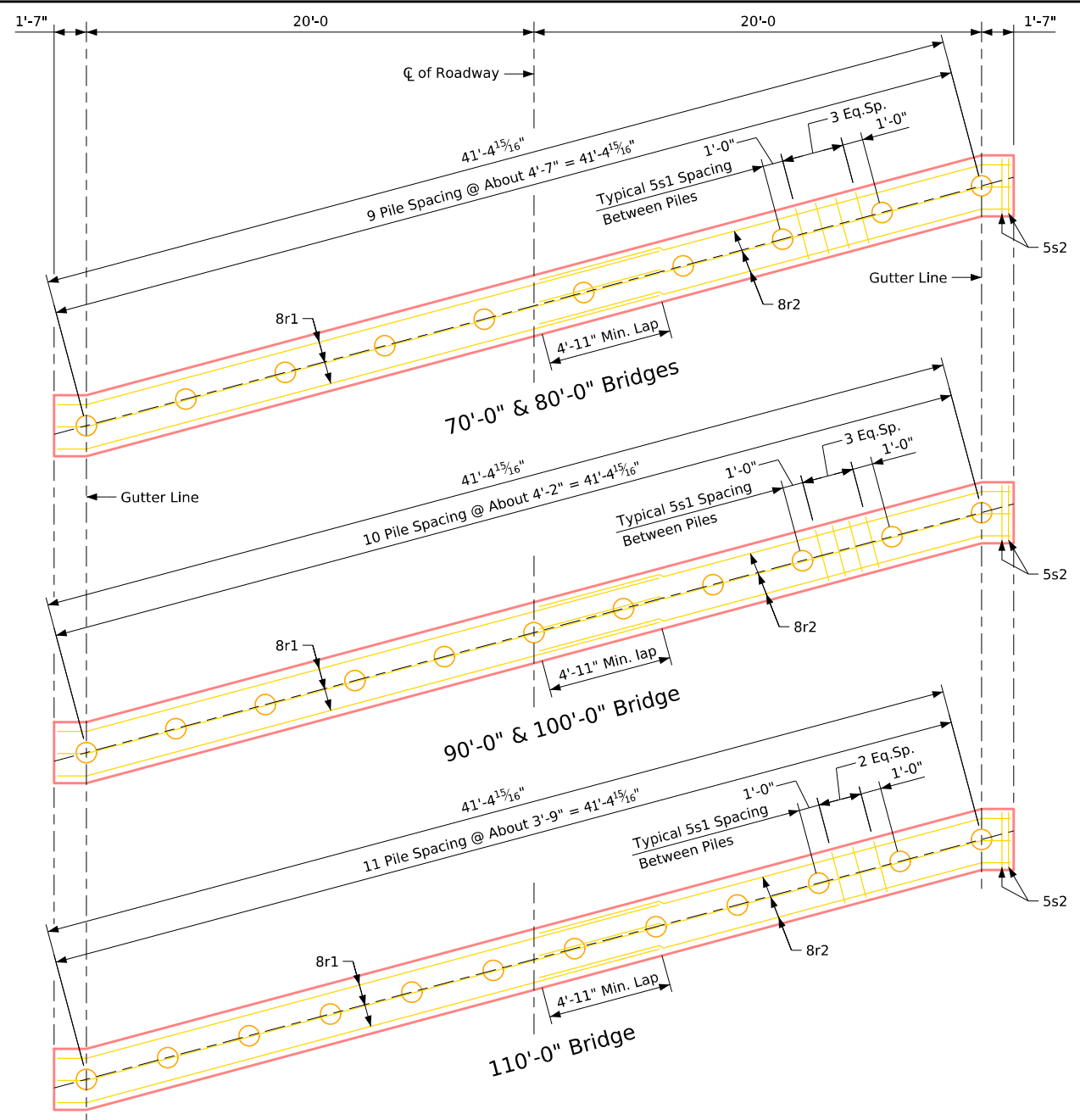
Rear Elevation

Note: The bottom of the footing is to be sloped to compensate for the grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



Plan View

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Abutment Details 15° Skew - Timber Piling (1 of 2)		J40-31-25




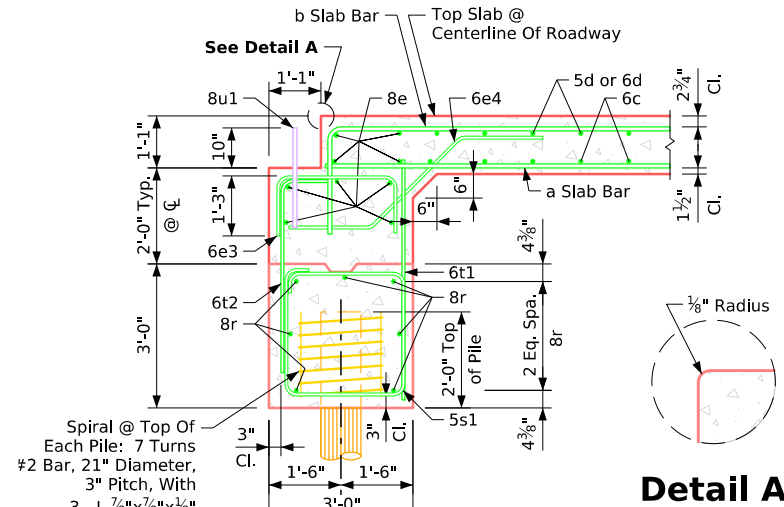
**Pile Plan - 15° Skew
Timber Piling**

Number of Piles and Abutment Design Loads

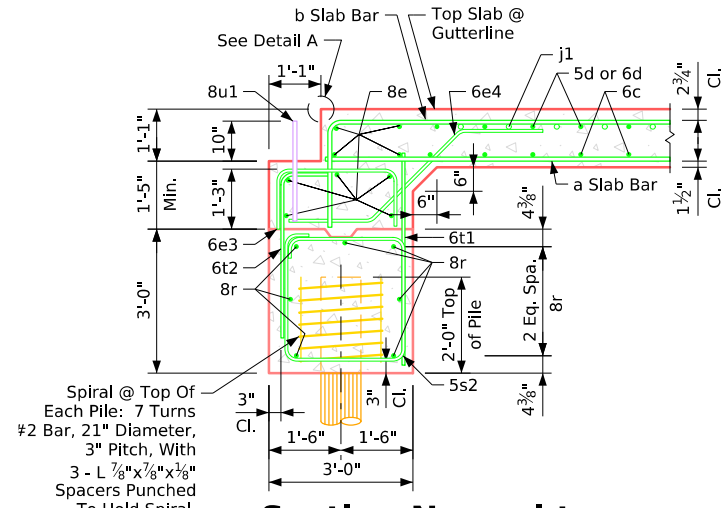
Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	10	10	11	11	12	13	13	15	16
Pu, Strength 1 Design Load - kips	488	520	550	590	627	671	713	Δ835	Δ884

Δ Includes dynamic load allowance
note: pu, strength 1 design load (kips) is not the value used in the field for driving piles.

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
		July, 2025
Abutment Details 15° Skew - Timber Piling (2 of 2)		J40-32-25



Section Normal to Abutment @ ζ



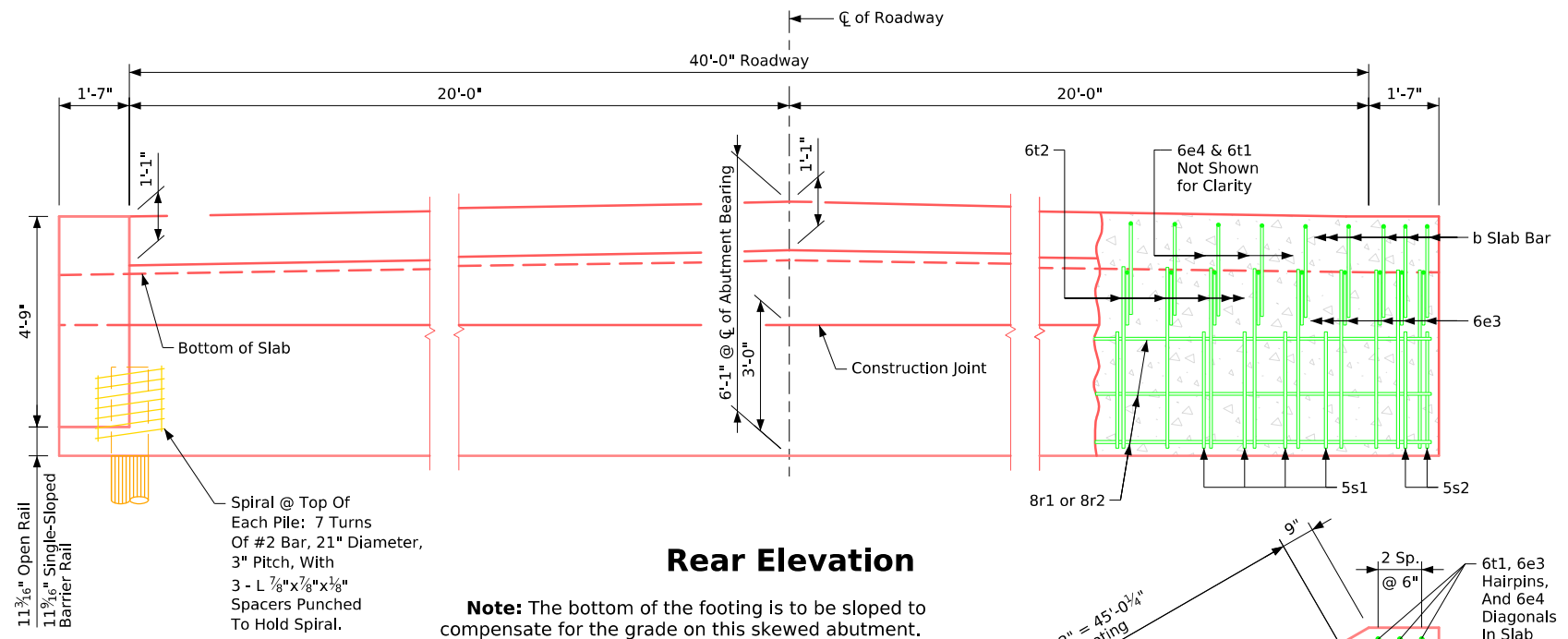
Section Normal to Abutment @ Gutter Line

ABUTMENT NOTES:

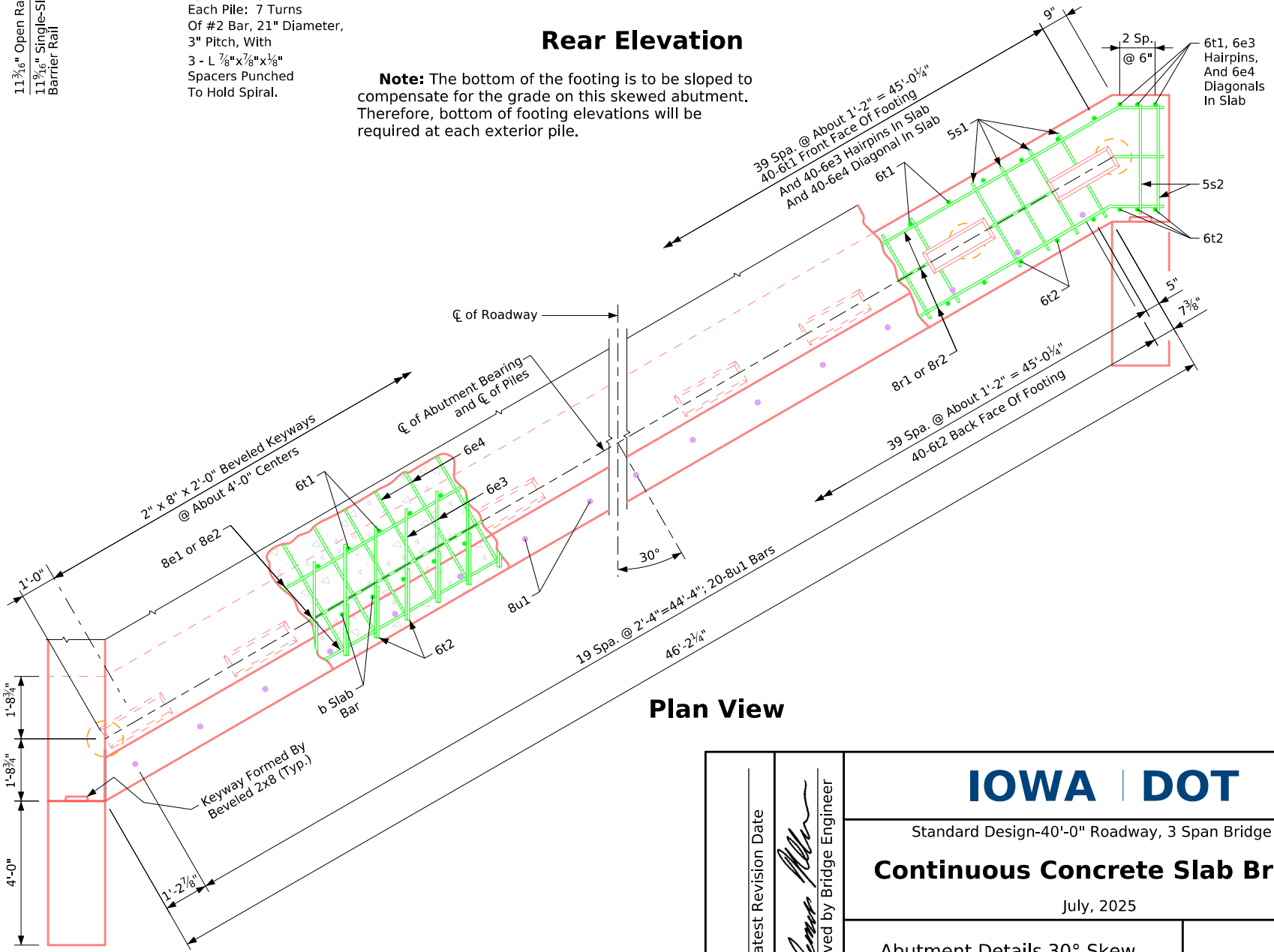
The concrete and reinforcing steel for the wings is included with the superstructure.
 Details on this sheet apply only when abutments are placed on timber piles.
 The minimum clear distance from the face of the concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown.
 Timber piles shall be driven to full penetration if practicable, but in no case to a bearing value less than specified in the design plans. Timber piles shall not be driven to more than 160 tons.
 All reinforcing steel shall be Grade 60.
 Abutment piling was designed for HL-93 loading with an allowance for a 20 lbs. per sq. ft. future wearing surface.

NOTES:

Barrier rails and reinforcement not shown.
 Wing reinforcing not shown.
 5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.

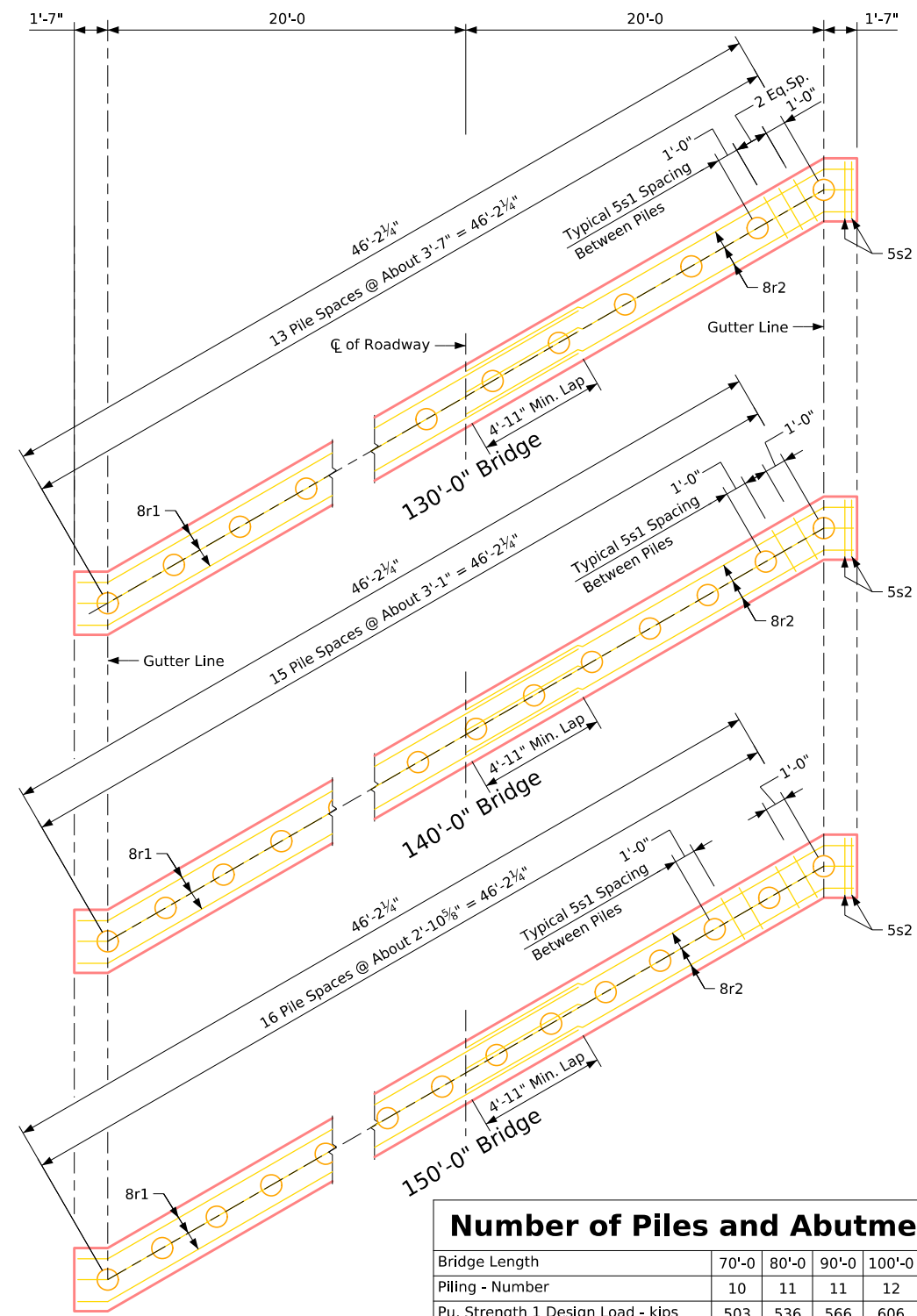
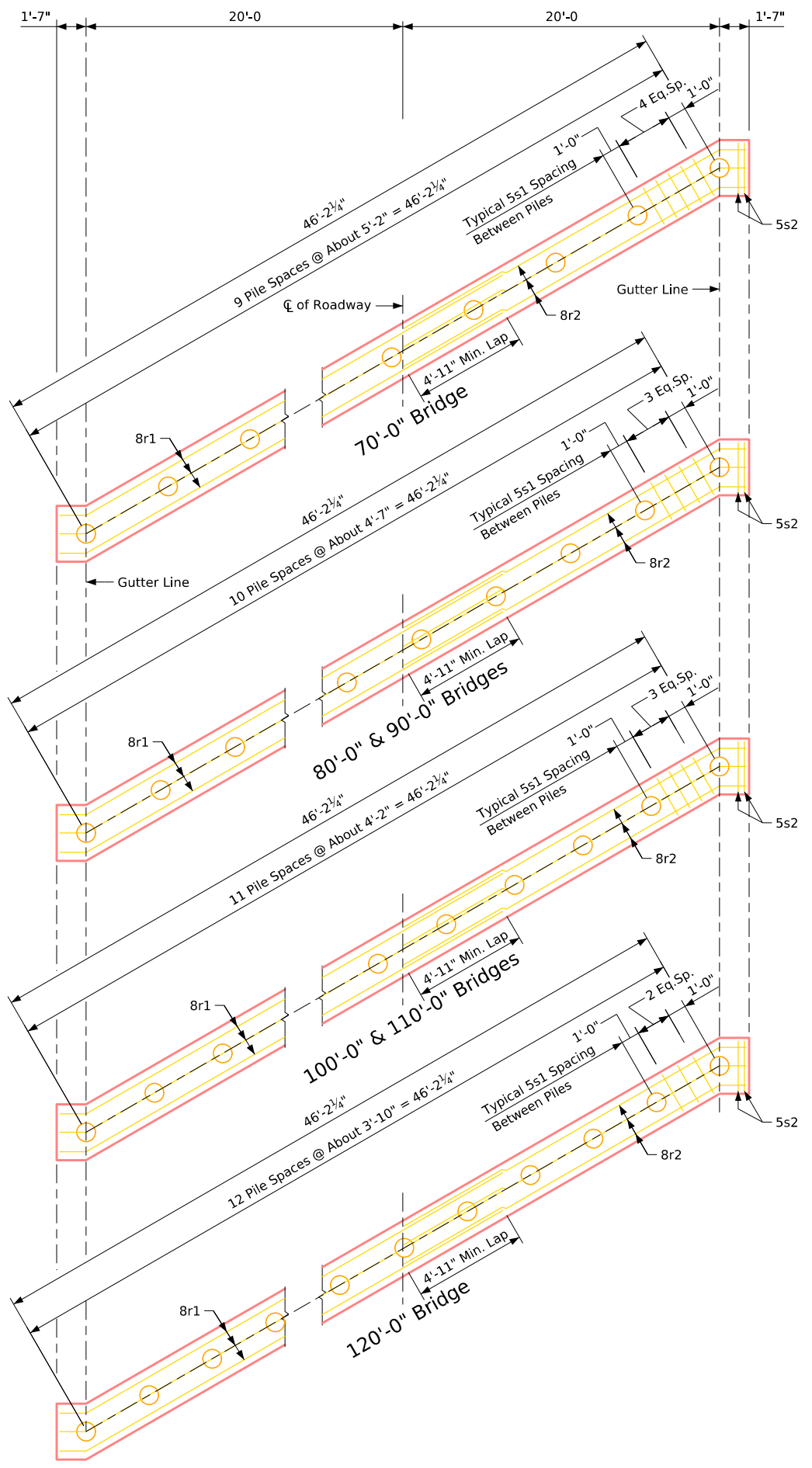


Rear Elevation



Plan View


Latest Revision Date Approved by Bridge Engineer 	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Abutment Details 30° Skew - Timber Piling (1 of 2)	J40-33-25



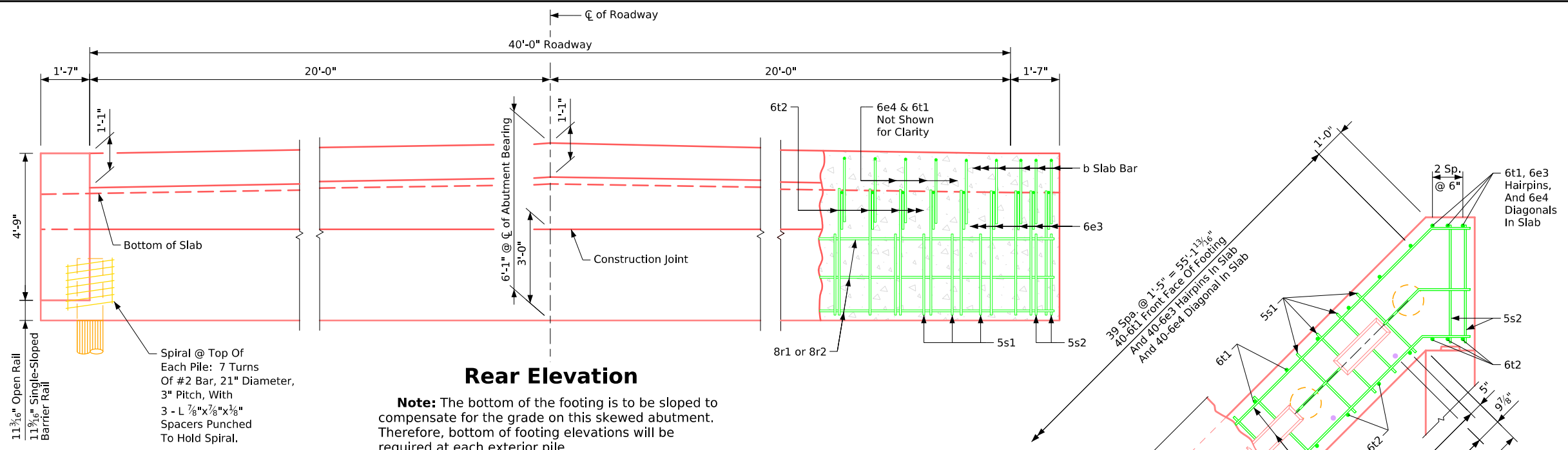
**Pile Plan - 30° Skew
Timber Piling**

Number of Piles and Abutment Design Loads										
Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0	
Piling - Number	10	11	11	12	12	13	14	16	17	
Pu, Strength 1 Design Load - kips	503	536	566	606	644	687	729	Δ852	Δ901	

Δ Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

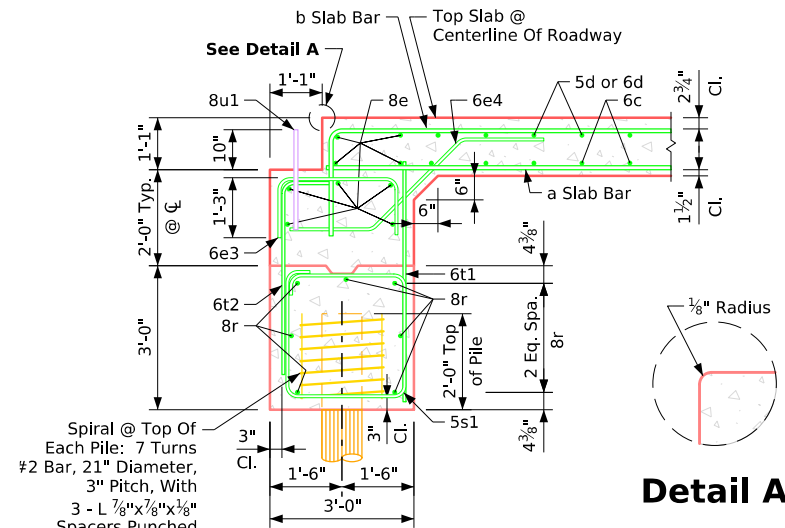
Latest Revision Date  Approved by Bridge Engineer	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025
	Abutment Details 30° Skew - Timber Piling (2 of 2)

J40-34-25

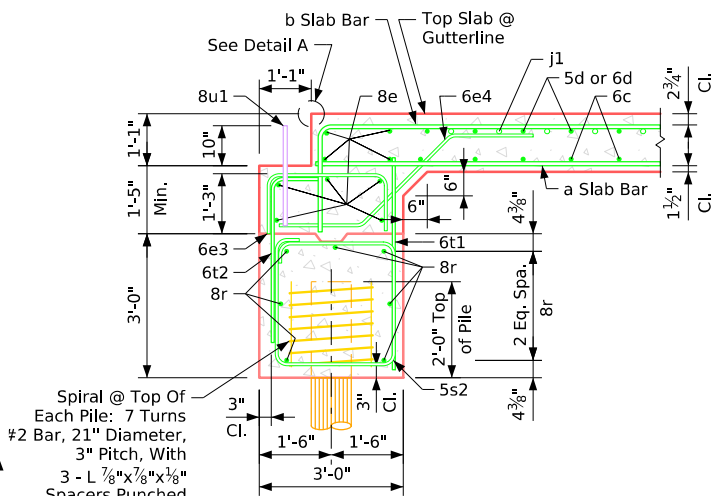


Rear Elevation

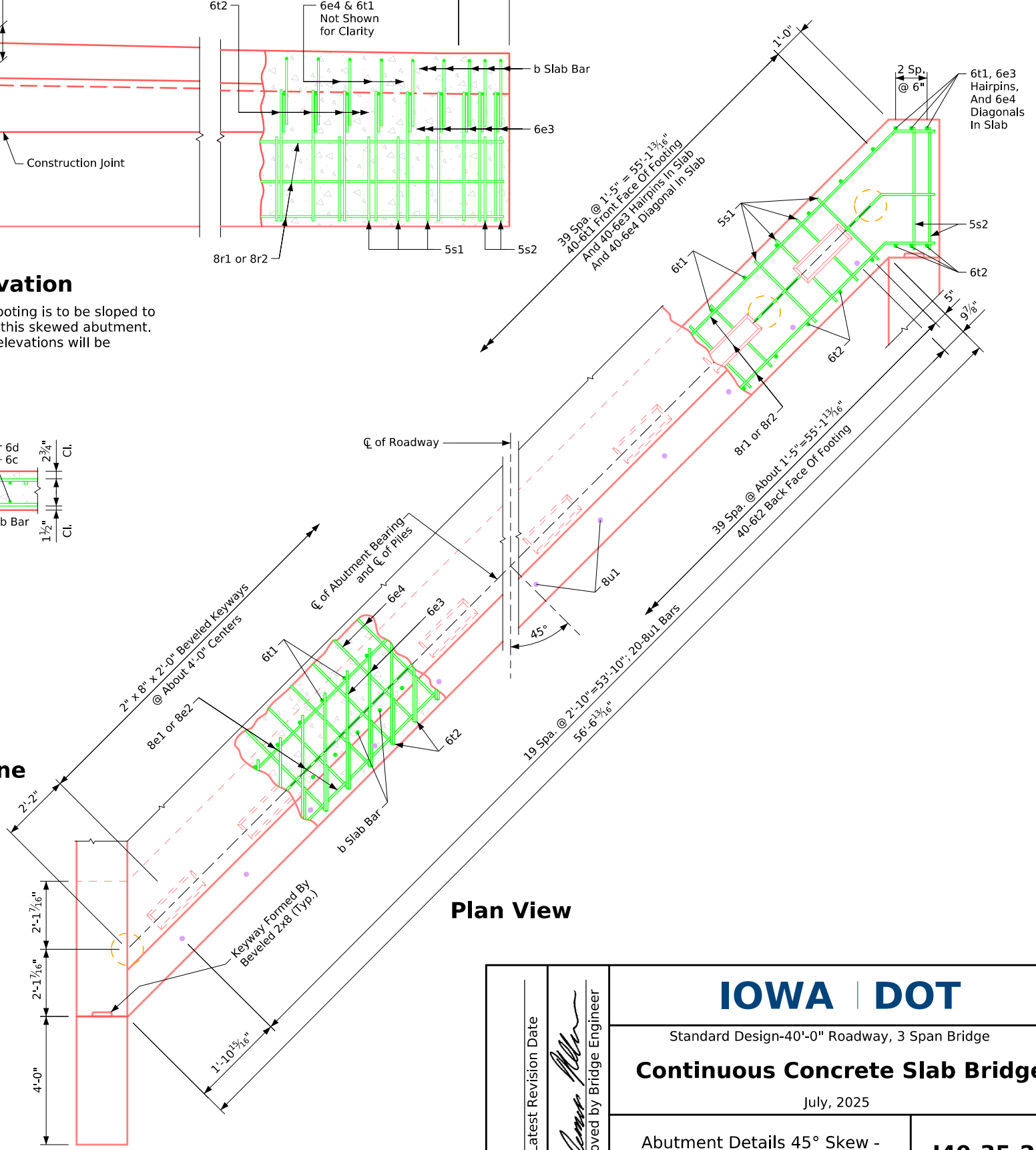
Note: The bottom of the footing is to be sloped to compensate for the grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



Section Normal to Abutment @ \bar{C}



Section Normal to Abutment @ Gutter Line



Plan View

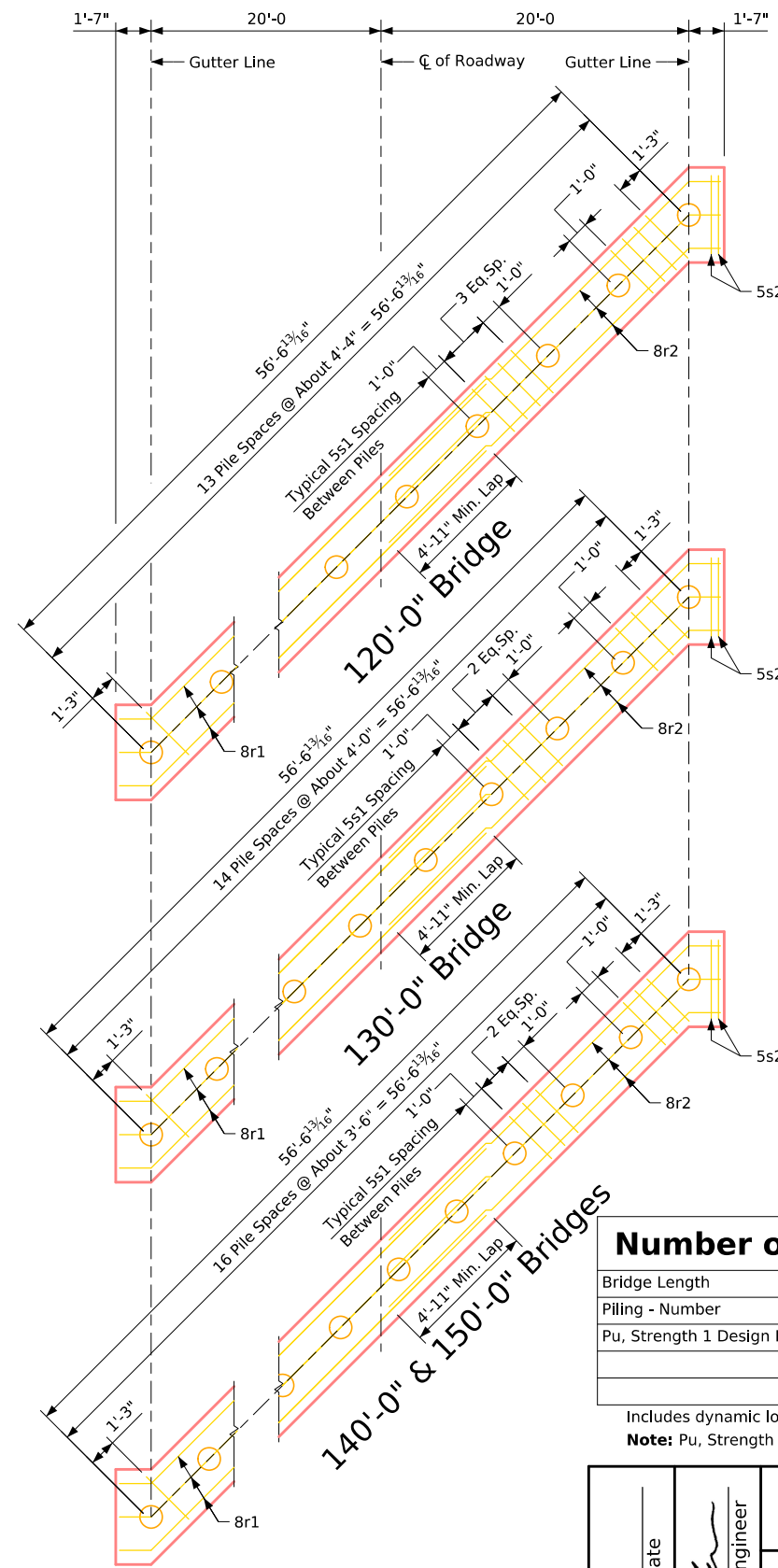
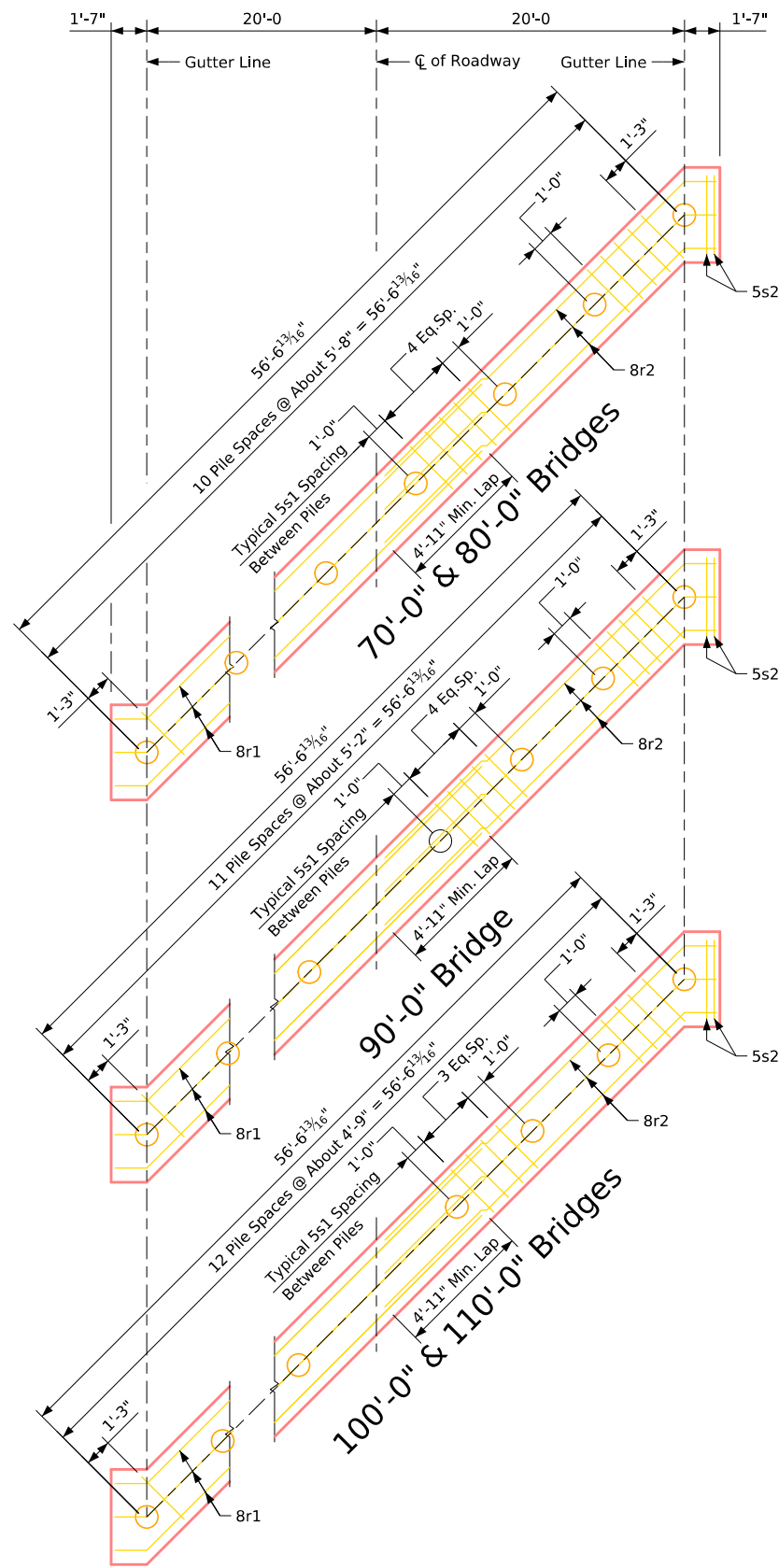
ABUTMENT NOTES:

- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet apply only when abutments are placed on timber piles.
- The minimum clear distance from the face of the concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown.
- Timber piles shall be driven to full penetration if practicable, but in no case to a bearing value less than specified in the design plans. Timber piles shall not be driven to more than 160 tons.
- All reinforcing steel shall be Grade 60.
- Abutment piling was designed for HL-93 loading with an allowance for a 20 lbs. per sq. ft. future wearing surface.

NOTES:

- Barrier rails and reinforcement not shown.
- Wing reinforcing not shown.
- 5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
- 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.


Latest Revision Date Approved by Bridge Engineer 	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge July, 2025	
	Abutment Details 45° Skew - Timber Piling (1 of 2)	J40-35-25



**Pile Plan - 45° Skew
Timber Piling**

Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	11	11	12	13	13	14	15	17	17
Pu, Strength 1 Design Load - kips	538	570	601	641	679	723	765	Δ888	Δ938

Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
		July, 2025
Abutment Details 45° Skew - Timber Piling (2 of 2)		J40-36-25

BILL OF REINFORCING STEEL - ONE ABUTMENT - 0°Skew

Bridge Length				70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0									
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight								
8r1	Abutment Footing Longitudinal	—	26'-4	7	492	7	492	7	492	7	492	7	492								
8r2	Abutment Footing Longitudinal	—	21'-4	7	399	7	399	7	399	7	399	7	399								
5s1	Abutment Footing Hoops	□	11'-0	40	459	40	459	34	390	34	390	37	425	40	459	40	459	32	367	34	390
6t1	Footing To Slab Bars	—	5'-0	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars	—	5'-7	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral	⌀	38'-6	10	64	10	64	11	71	11	71	12	77	13	84	13	84	15	96	16	103
	Spiral Spacers - L 7/8x7/8x1/2x 0.70	—	1'-10	30	39	30	39	33	43	33	43	36	47	39	50	39	50	45	58	48	62
Reinforcing steel epoxy coated - total (lbs.)					2184		2184		2126		2126		2171		2215		2215		2143		2177

BILL OF REINFORCING STEEL - ONE ABUTMENT - 15°Skew

Bridge Length				70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0									
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight								
8r1	Abutment Footing Longitudinal	—	27'-2	7	508	7	508	7	508	7	508	7	508								
8r2	Abutment Footing Longitudinal	—	22'-1	7	413	7	413	7	413	7	413	7	413								
5s1	Abutment Footing Hoops	□	11'-0	36	413	36	413	40	459	40	459	33	379	36	413	36	413	28	321	30	344
5s2	Abutment Footing Hoops	□	11'-3	4	47	4	47	4	47	4	47	4	47	4	47	4	47	4	47	4	47
6t1	Footing To Slab Bars	—	5'-0	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars	—	5'-7	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral	⌀	38'-6	10	64	10	64	11	71	11	71	12	77	13	84	13	84	15	96	16	103
	Spiral Spacers - L 7/8x7/8x1/2x 0.70	—	1'-10	30	39	30	39	33	43	33	43	36	47	39	50	39	50	45	58	48	62
Reinforcing steel epoxy coated - total (lbs.)					2215		2215		2272		2272		2202		2246		2246		2174		2208

BILL OF REINFORCING STEEL - ONE ABUTMENT - 30°Skew

Bridge Length				70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0									
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight								
8r1	Abutment Footing Longitudinal	—	29'-6	7	551	7	551	7	551	7	551	7	551								
8r2	Abutment Footing Longitudinal	—	24'-5	7	456	7	456	7	456	7	456	7	456								
5s1	Abutment Footing Hoops	□	11'-0	45	516	40	459	40	459	44	505	44	505	36	413	39	447	30	344	32	367
5s2	Abutment Footing Hoops	□	11'-11	4	50	4	50	4	50	4	50	4	50	4	50	4	50	4	50	4	50
6t1	Footing To Slab Bars	—	5'-0	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars	—	5'-7	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral	⌀	38'-6	10	64	11	71	11	71	12	77	12	77	13	84	14	90	16	103	17	109
	Spiral Spacers - L 7/8x7/8x1/2x 0.70	—	1'-10	30	39	33	43	33	43	36	47	36	47	39	50	42	54	48	62	51	66
Reinforcing steel epoxy coated - total (lbs.)					2407		2361		2361		2417		2417		2335		2379		2297		2330

BILL OF REINFORCING STEEL - ONE ABUTMENT - 45°Skew

Bridge Length				70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0									
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight								
8r1	Abutment Footing Longitudinal	—	34'-8	7	648	7	648	7	648	7	648	7	648								
8r2	Abutment Footing Longitudinal	—	29'-7	7	553	7	553	7	553	7	553	7	553								
5s1	Abutment Footing Hoops	□	11'-0	50	574	50	574	55	631	48	551	48	551	52	597	42	482	48	551	48	551
5s2	Abutment Footing Hoops	□	13'-6	4	56	4	56	4	56	4	56	4	56	4	56	4	56	4	56	4	56
6t1	Footing To Slab Bars	—	5'-0	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars	—	5'-7	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral	⌀	38'-6	11	71	11	71	12	77	13	84	13	84	14	90	15	96	17	109	17	109
	Spiral Spacers - L 7/8x7/8x1/2x 0.70	—	1'-10	33	43	33	43	36	47	39	50	39	50	42	54	45	58	51	66	51	66
Reinforcing steel epoxy coated - total (lbs.)					2676		2676		2743		2673		2673		2729		2624		2714		2714

Note: The pile spirals and spiral spacers are to be non-coated reinforcing but may be epoxy-coated at the contractor's option and expense.

ESTIMATED QUANTITIES - ONE ABUT. - 0°Skew

Location	Unit	Quantity									
Bridge Length		70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0	
Structural Concrete (Bridge)	c.y.	13.8	13.8	13.8	13.8	13.7	13.6	13.6	13.5	13.5	
Reinforcing Steel, Epoxy-Coated	lbs.	2184	2184	2126	2126	2171	2215	2215	2143	2177	
Wood Piles (Treated)	no.	10	10	11	11	12	13	13	15	16	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	150	

ESTIMATED QUANTITIES - ONE ABUT. - 15°Skew

Location	Unit	Quantity									
Bridge Length		70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0	
Structural Concrete (Bridge)	c.y.	14.3	14.3	14.3	14.3	14.2	14.1	14.1	14.0	14.0	
Reinforcing Steel, Epoxy-Coated	lbs.	2215	2215	2272	2272	2202	2246	2246	2174	2208	
Wood Piles (Treated)	no.	10	10	11	11	12	13	13	15	16	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	160	

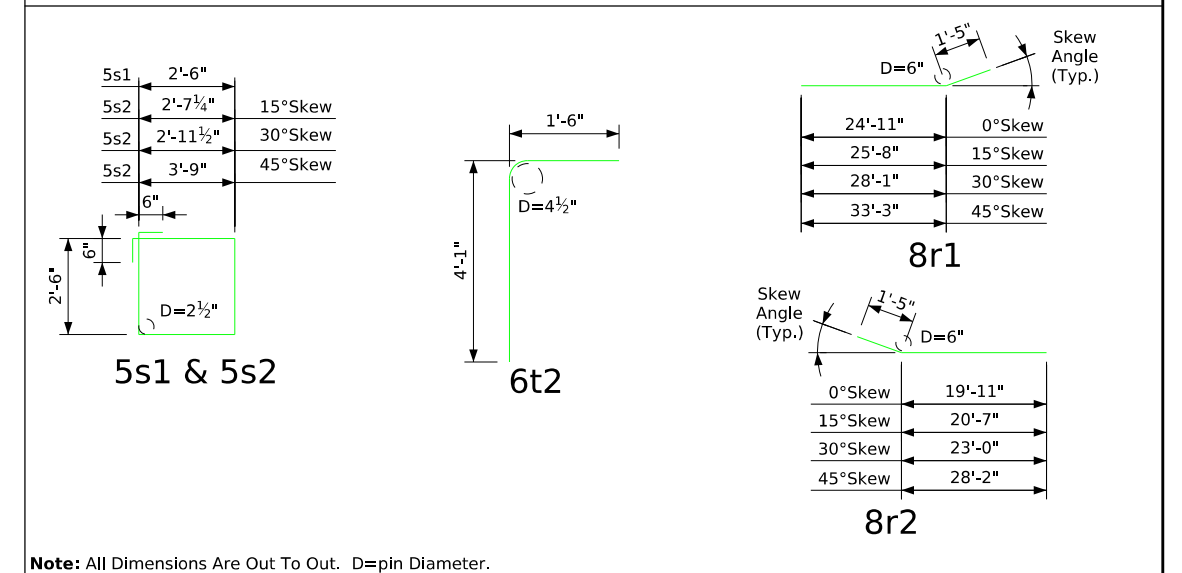
ESTIMATED QUANTITIES - ONE ABUT. - 30°Skew


Location	Unit	Quantity									
Bridge Length		70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0	
Structural Concrete (Bridge)	c.y.	16.0	16.0	16.0	15.9	15.9	15.8	15.8	15.7	15.6	
Reinforcing Steel, Epoxy-Coated	lbs.	2407	2361	2361	2417	2417	2335	2379	2297	2330	
Wood Piles (Treated)	no.	10	11	11	12	12	13	14	16	17	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	160	170	

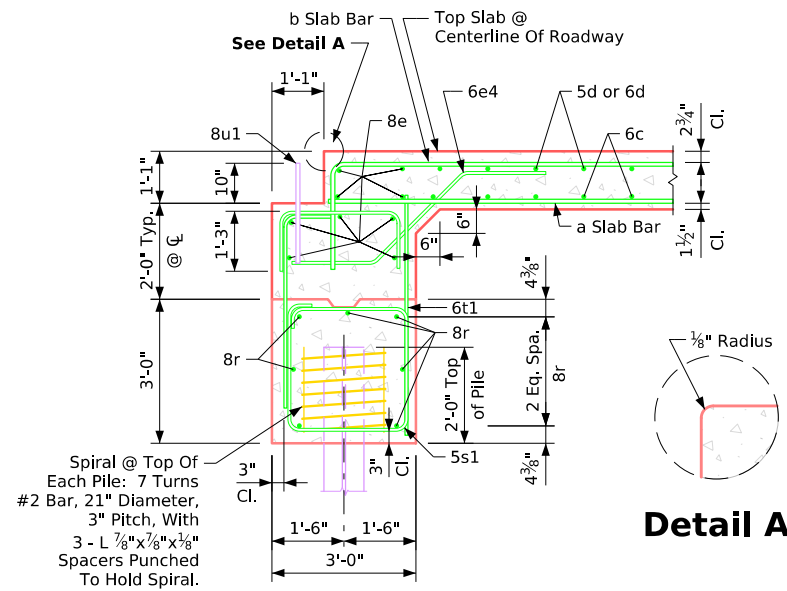
ESTIMATED QUANTITIES - ONE ABUT. - 45°Skew

Location	Unit	Quantity									
Bridge Length		70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0	
Structural Concrete (Bridge)	c.y.	19.7	19.7	19.7	19.6	19.6	19.5	19.4	19.4	19.4	
Reinforcing Steel, Epoxy-Coated	lbs.	2676	2676	2743	2673	2673	2729	2624	2714	2714	
Wood Piles (Treated)	no.	11	11	12	13	13	14	15	17	17	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	170	170	

BENT BAR DETAILS

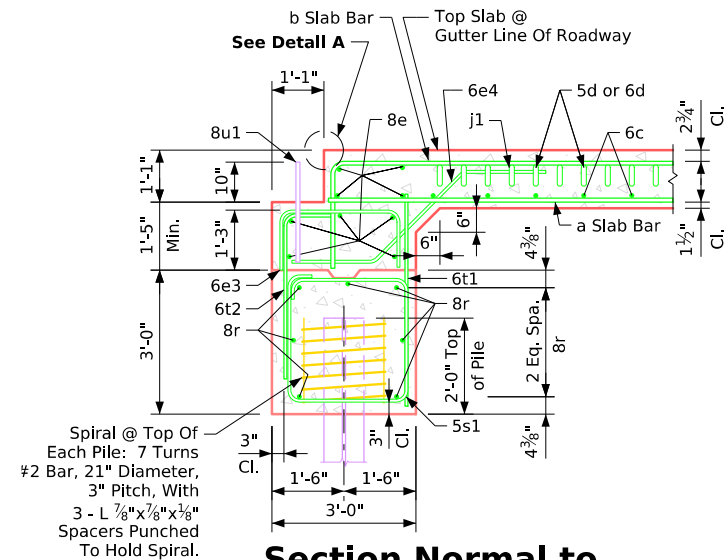


Latest Revision Date  Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge
	Continuous Concrete Slab Bridge July, 2025
	Abutment General Details - Timber Piling



Section Normal to Abutment @ Cl
(Bridge Lengths 70-110ft)

Detail A



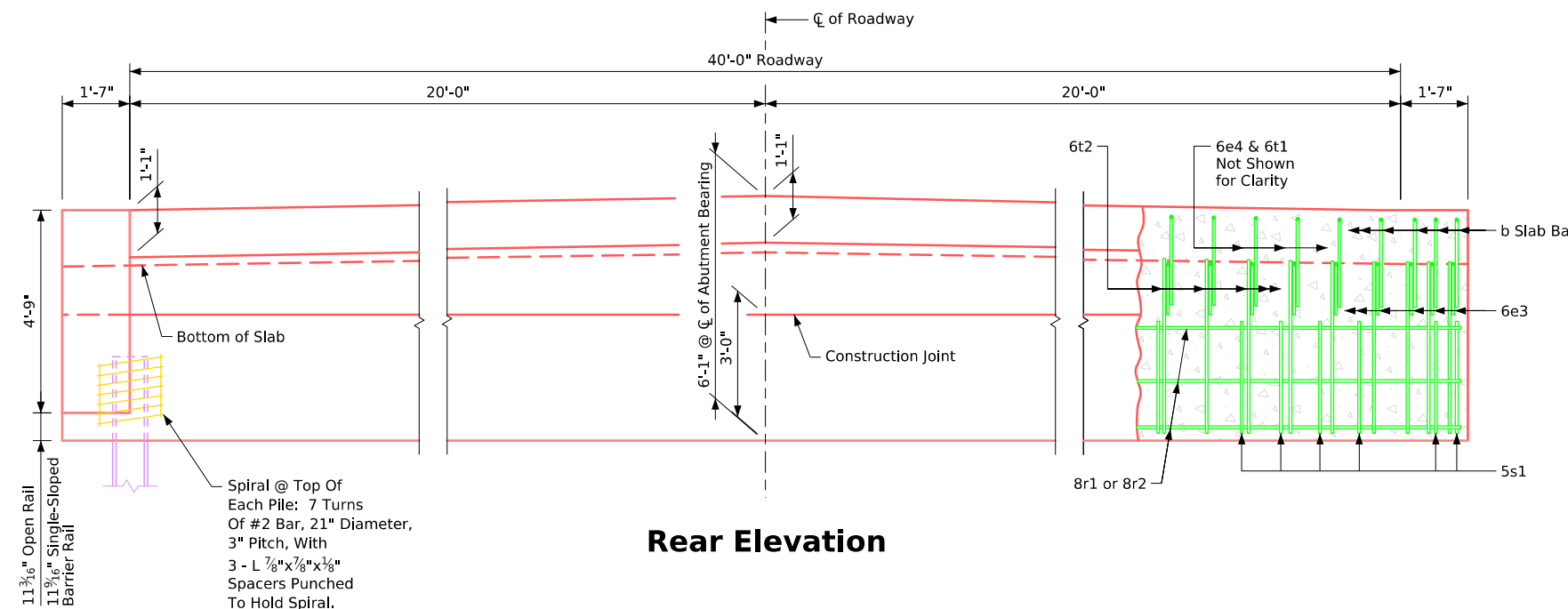
Section Normal to Abutment @ Gutter Line

ABUTMENT NOTES:

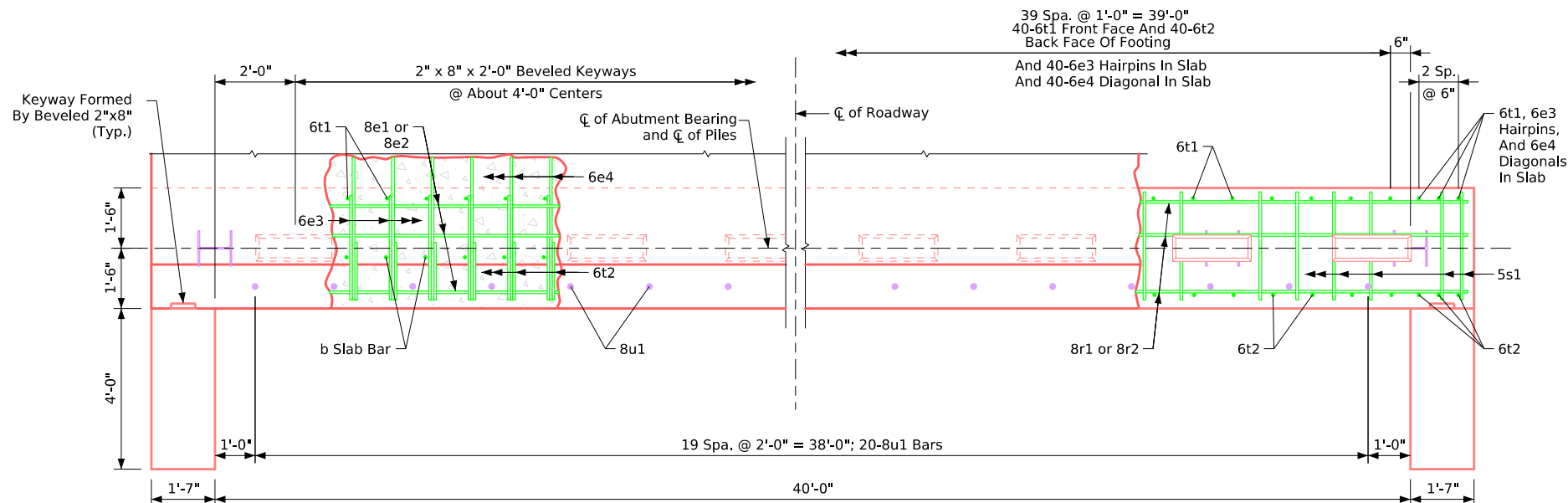
- All piling are HP 10x42.
- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet are to be used only when abutments are placed on steel piles. If rock is encountered closer than 12'-0" below the abutment footing, special analysis may be required.
- The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted or shown.
- Steel abutment piles shall be driven to full penetration if practicable, but in no case to a bearing value less than shown in the design plans.
- All reinforcing steel is to be Grade 60.
- Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

NOTES:


- Barrier rails and reinforcement not shown.
- Wing reinforcing not shown.
- 5s1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
- 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.

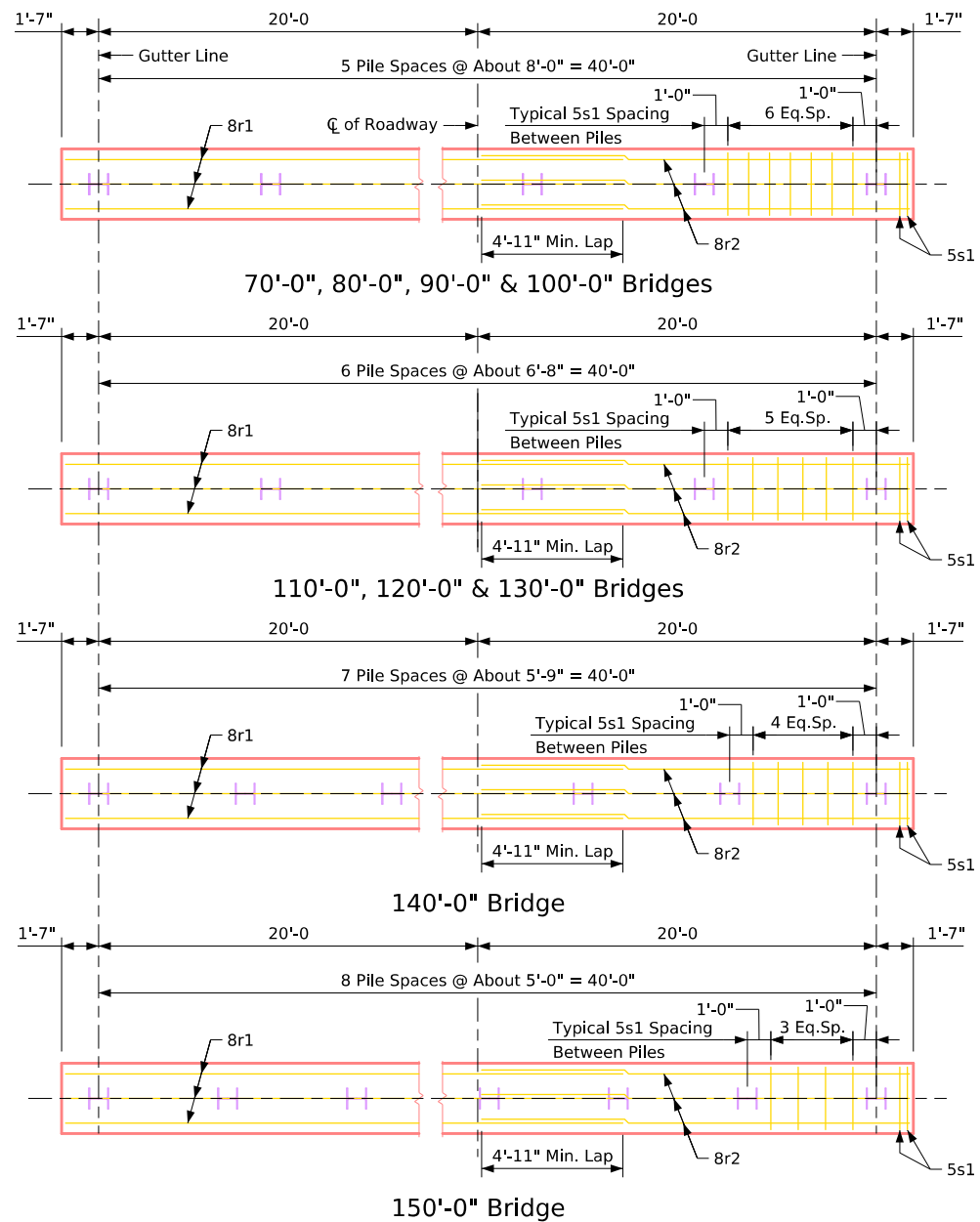


Rear Elevation



Plan View


Latest Revision Date  Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
July, 2025		
Abutment Details 0° Skew - Steel Piling (1 of 2)		J40-38-25

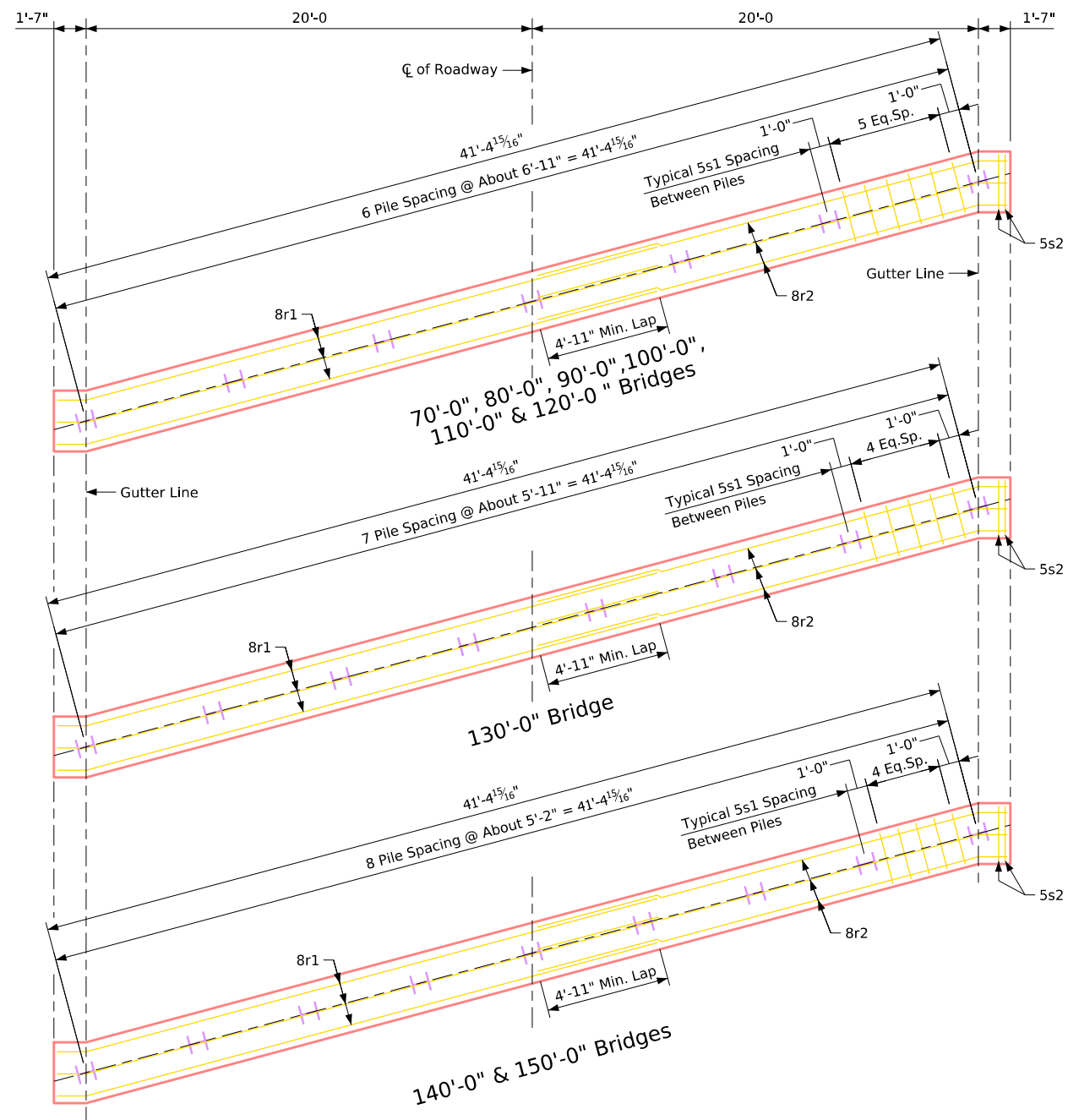


**Pile Plan - 0° Skew
Steel Piling**

Number of Piles and Abutment Design Loads									
Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	6	6	6	6	7	7	7	8	9
Pu, Strength 1 Design Load - kips	483	515	546	585	623	666	708	Δ830	Δ879

Δ Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date  Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025	
	Abutment Details 0° Skew - Steel Piling (2 of 2)	J40-39-25



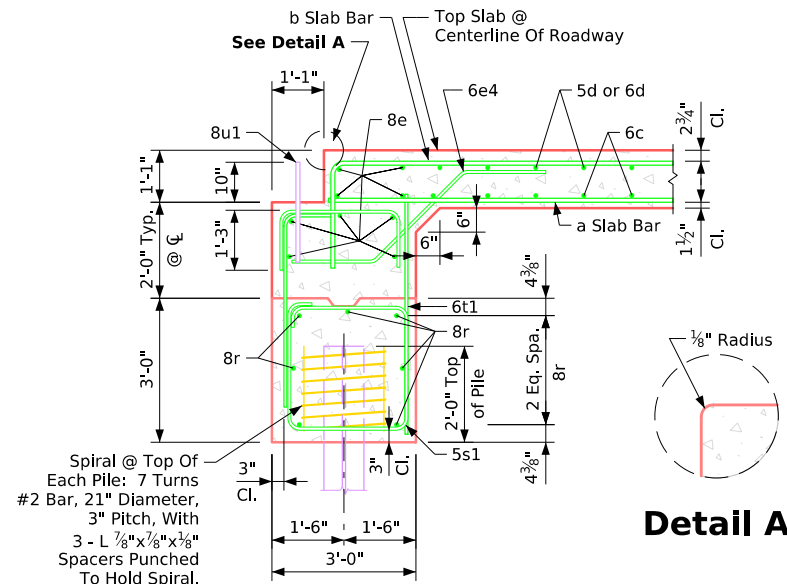
**Pile Plan - 15° Skew
Steel Piling**

Number of Piles and Abutment Design Loads

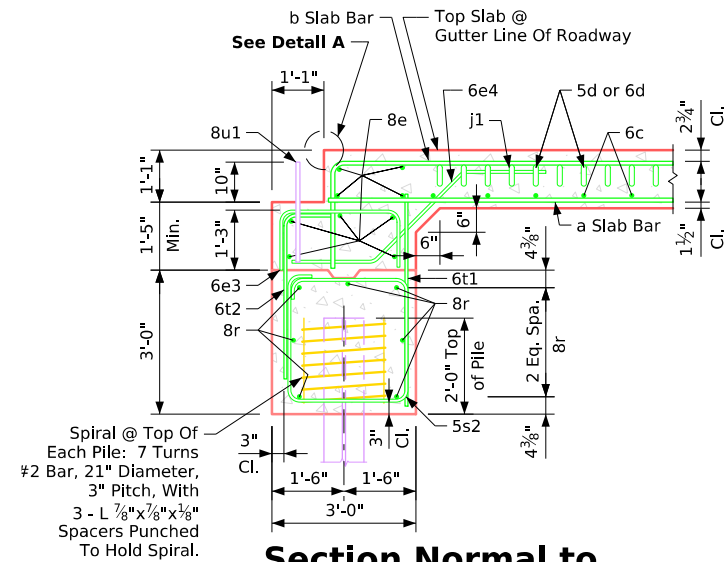
Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	7	7	7	7	7	7	8	9	9
Pu, Strength 1 Design Load - kips	488	520	550	590	627	671	713	Δ835	Δ884

Δ Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025	
	Abutment Details 15° Skew - Steel Piling (2 of 2)	J40-41-25



Section Normal to Abutment @ CL
(Bridge Lengths 70-110ft)



Section Normal to Abutment @ Gutter Line

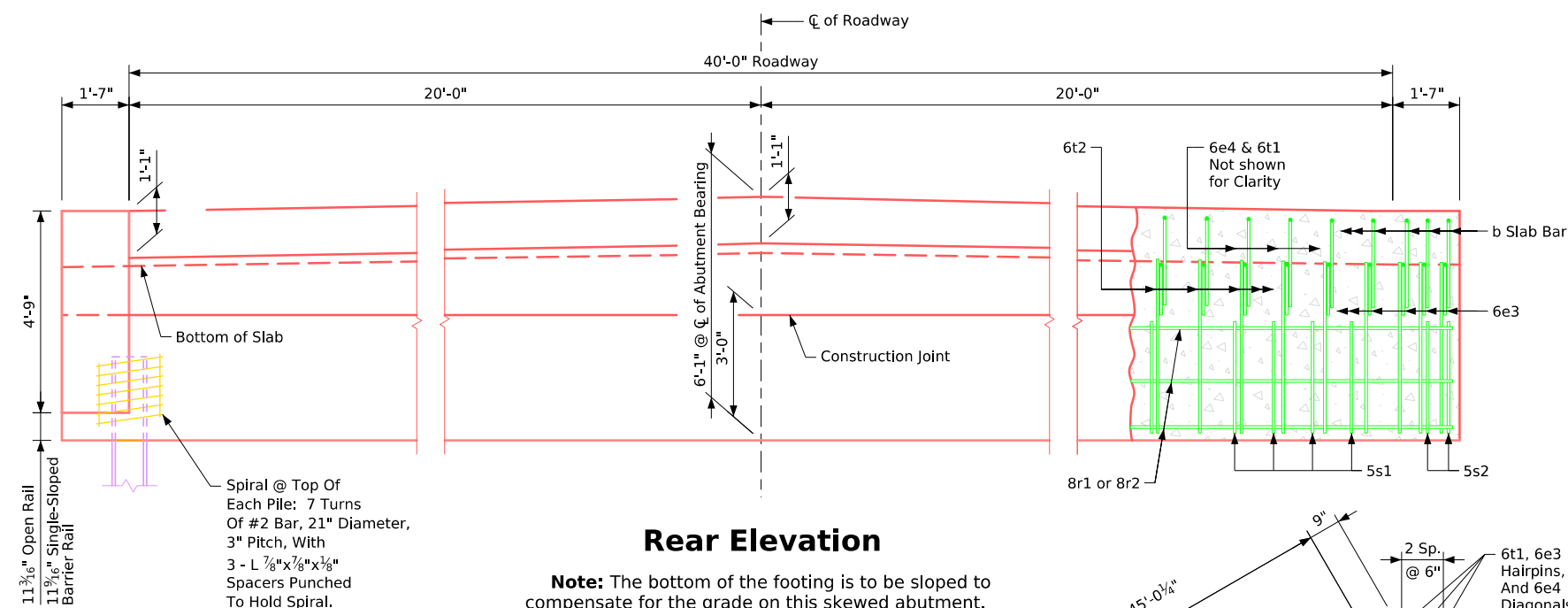
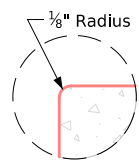
ABUTMENT NOTES:

- All piling are HP 10x42.
- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet are to be used only when abutments are placed on steel piles. If rock is encountered closer than 12'-0" below the abutment footing, special analysis may be required.
- The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted or shown.
- Steel abutment piles shall be driven to full penetration if practicable, but in no case to a bearing value less than shown in the design plans.
- All reinforcing steel is to be Grade 60.
- Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

NOTES:

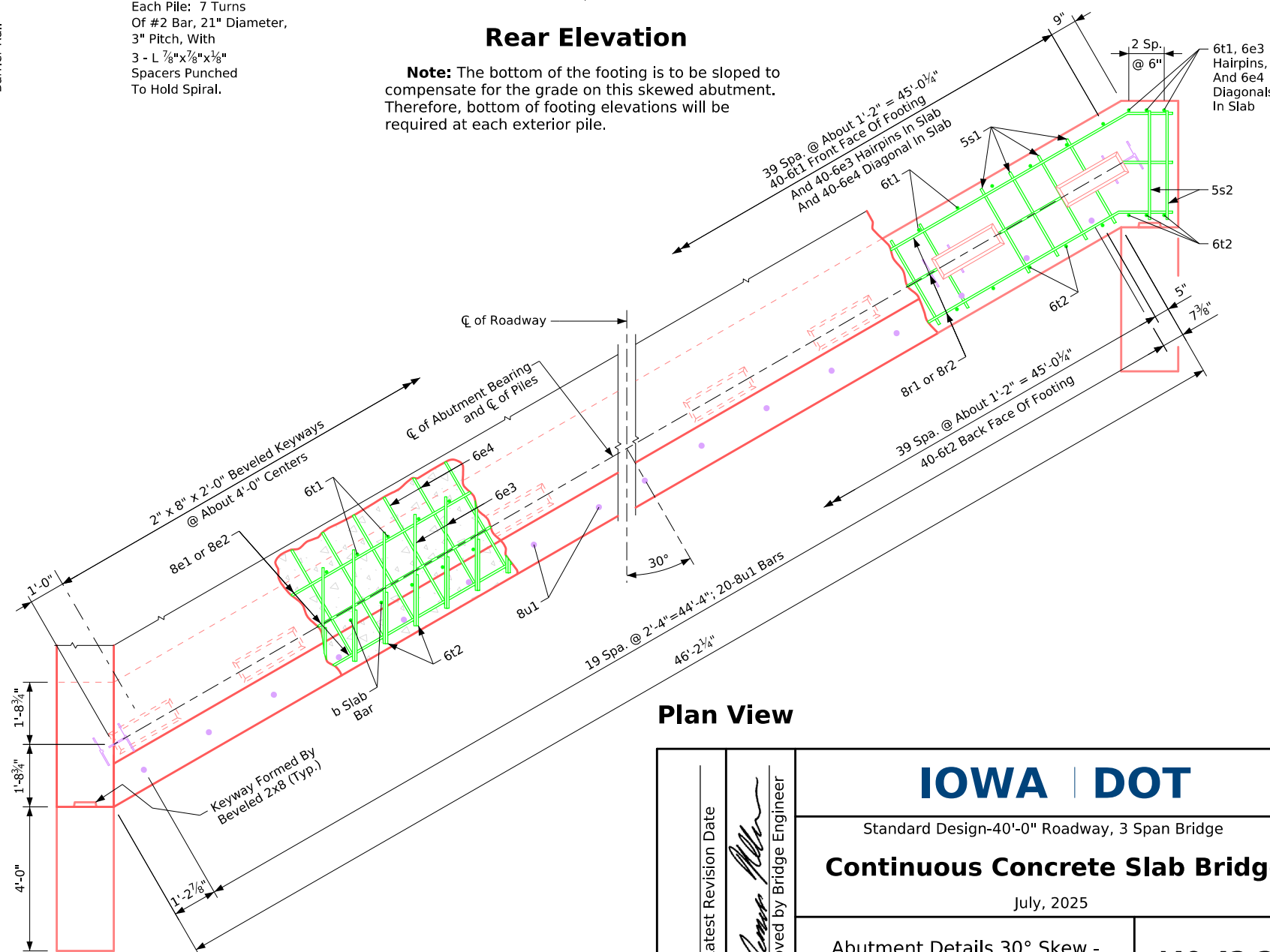
- Barrier rails and reinforcement not shown.
- Wing reinforcement not shown.
- 5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. For additional details, see Sheet **J40-20-25**.
- 6e3, 6e4, and 8e bars are included in the **Superstructure Quantities** for each individual bridge length.

Detail A



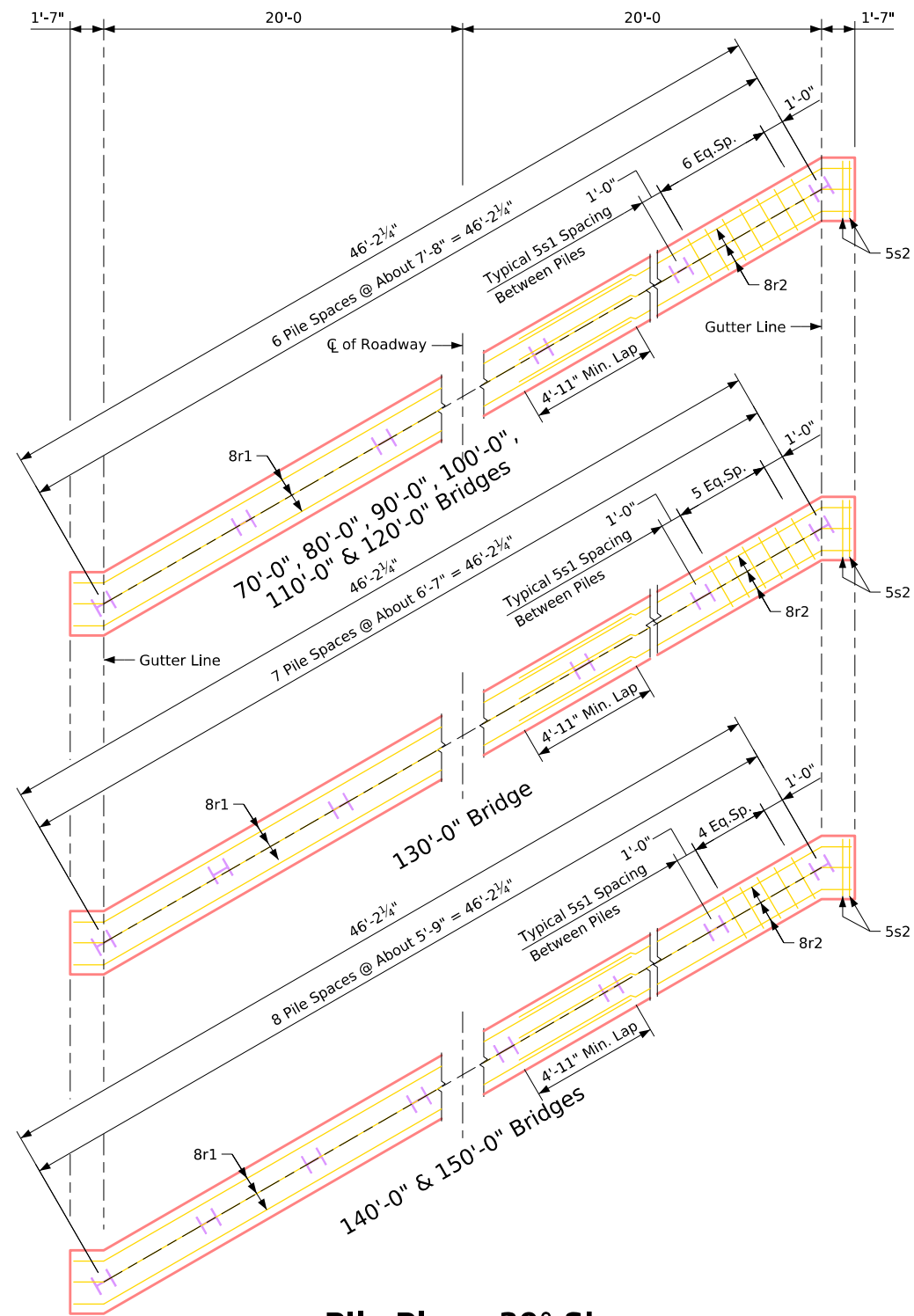
Rear Elevation

Note: The bottom of the footing is to be sloped to compensate for the grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



Plan View

Latest Revision Date Approved by Bridge Engineer 	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
	Abutment Details 30° Skew - Steel Piling (1 of 2)	J40-42-25



**Pile Plan - 30° Skew
Steel Piling**

Number of Piles and Abutment Design Loads

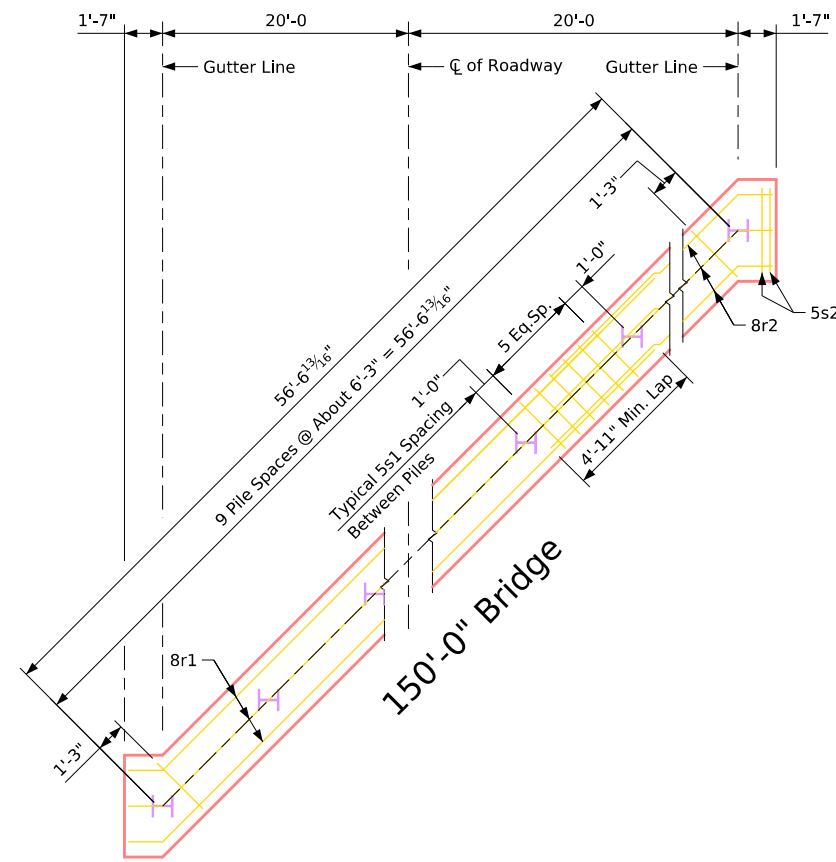
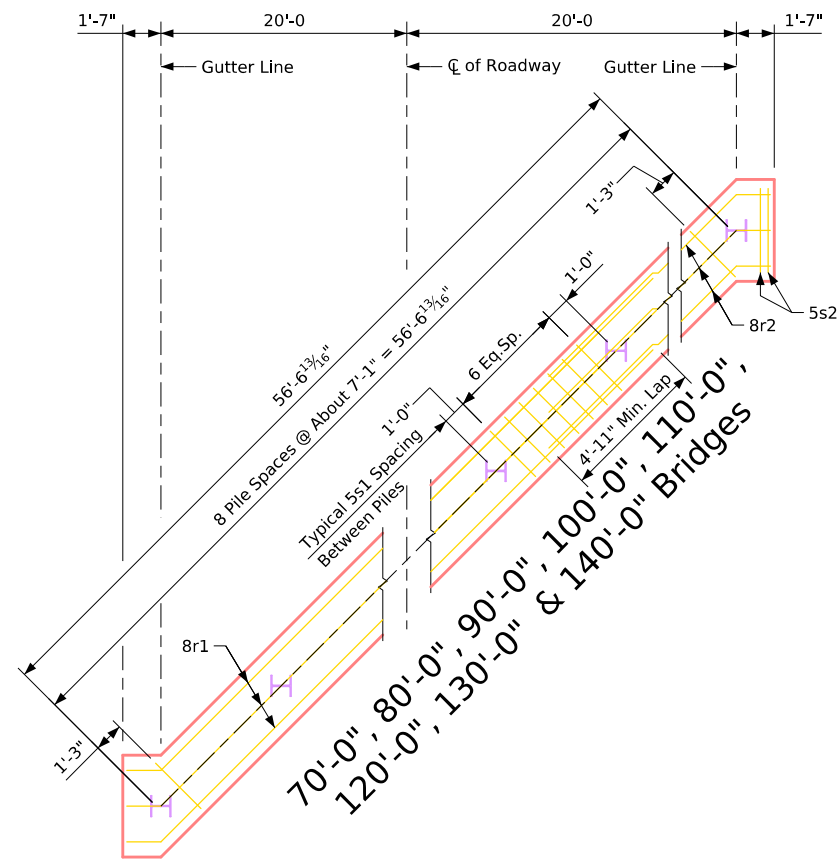
Bridge Length	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
Piling - Number	7	7	7	7	7	7	8	9	9
Pu, Strength 1 Design Load - kips	503	536	566	606	644	687	729	Δ852	Δ901

Δ Includes dynamic load allowance

Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date Approved by Bridge Engineer 	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025
	Abutment Details 30° Skew - Steel Piling (2 of 2)

J40-43-25



**Pile Plan 45° Skew
Steel Piling**

Note: All piles are to be oriented with the webs perpendicular to the C of the Roadway as shown.

Number of Piles and Abutment Design Loads

Bridge Length	70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Piling - Number	9	9	9	9	9	9	9	9	10
Pu, Strength 1 Design Load - kips	538	570	601	641	679	723	765	Δ888	Δ938

Δ Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

Latest Revision Date	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer <i>[Signature]</i>	July, 2025	
	Abutment Details 45° Skew - Steel Piling (2 of 2)	J40-45-25

BILL OF REINFORCING STEEL - ONE ABUTMENT - 0°Skew

Bridge Length				70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		26'-4"	7	492	7	492	7	492	7	492	7	492
8r2	Abutment Footing Longitudinal		21'-4"	7	399	7	399	7	399	7	399	7	399
5s1	Abutment Footing Hoops		11'-0"	39	447	39	447	39	447	39	447	36	413
6t1	Footing To Slab Bars		5'-0"	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars		5'-7"	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral		38'-6"	6	39	6	39	6	39	7	45	7	45
	Spiral Spacers - L 7/8x7/8x1/2x 0.70		1'-10"	18	24	18	24	18	24	21	27	21	27
Reinforcing steel epoxy coated - total (lbs.)					2132		2132		2132		2153		2153

BILL OF REINFORCING STEEL - ONE ABUTMENT - 15°Skew

Bridge Length				70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		27'-2"	7	508	7	508	7	508	7	508	7	508
8r2	Abutment Footing Longitudinal		22'-1"	7	413	7	413	7	413	7	413	7	413
5s1	Abutment Footing Hoops		11'-0"	36	413	36	413	36	413	36	413	40	459
5s2	Abutment Footing Hoops		11'-3"	4	47	4	47	4	47	4	47	4	47
6t1	Footing To Slab Bars		5'-0"	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars		5'-7"	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral		38'-6"	7	45	7	45	7	45	7	45	8	52
	Spiral Spacers - L 7/8x7/8x1/2x 0.70		1'-10"	21	28	21	28	21	28	21	27	21	27
Reinforcing steel epoxy coated - total (lbs.)					2184		2184		2184		2183		2251

BILL OF REINFORCING STEEL - ONE ABUTMENT - 30°Skew

Bridge Length				70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		29'-6"	7	551	7	551	7	551	7	551	7	551
8r2	Abutment Footing Longitudinal		24'-5"	7	456	7	456	7	456	7	456	7	456
5s1	Abutment Footing Hoops		11'-0"	42	482	42	482	42	482	42	482	40	459
5s2	Abutment Footing Hoops		11'-11"	4	50	4	50	4	50	4	50	4	50
6t1	Footing To Slab Bars		5'-0"	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars		5'-7"	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral		38'-6"	7	45	7	45	7	45	7	45	8	52
	Spiral Spacers - L 7/8x7/8x1/2x 0.70		1'-10"	21	27	21	27	21	27	21	27	24	31
Reinforcing steel epoxy coated - total (lbs.)					2342		2342		2342		2342		2352

BILL OF REINFORCING STEEL - ONE ABUTMENT - 45°Skew

Bridge Length				70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		34'-8"	7	648	7	648	7	648	7	648	7	648
8r2	Abutment Footing Longitudinal		29'-7"	7	553	7	553	7	553	7	553	7	553
5s1	Abutment Footing Hoops		11'-0"	56	642	56	642	56	642	56	642	56	642
5s2	Abutment Footing Hoops		13'-6"	4	56	4	56	4	56	4	56	4	56
6t1	Footing To Slab Bars		5'-0"	46	345	46	345	46	345	46	345	46	345
6t2	Footing To Slab Bars		5'-7"	46	386	46	386	46	386	46	386	46	386
#2	Pile Spiral		38'-6"	9	58	9	58	9	58	9	58	10	64
	Spiral Spacers - L 7/8x7/8x1/2x 0.70		1'-10"	27	35	27	35	27	35	27	35	30	39
Reinforcing steel epoxy coated - total (lbs.)					2723		2723		2723		2723		2711

Note: The pile spirals and spiral spacers are to be non-coated reinforcing but may be epoxy-coated at the contractor's option and expense.

ESTIMATED QUANTITIES - ONE ABUT. - 0°Skew

Location	Unit	Quantity									
Bridge Length		70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Structural Concrete (Bridge)	c.y.	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	
Reinforcing Steel, Epoxy-Coated	lbs.	2132	2132	2132	2132	2153	2153	2153	2151	2128	
Steel Piling HP 10x24	no.	6	6	6	6	7	7	7	8	9	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	80	90	

ESTIMATED QUANTITIES - ONE ABUT. - 15°Skew

Location	Unit	Quantity									
Bridge Length		70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Structural Concrete (Bridge)	c.y.	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	
Reinforcing Steel, Epoxy-Coated	lbs.	2184	2184	2184	2184	2184	2184	2183	2251	2251	
Steel Piling HP 10x24	no.	7	7	7	7	7	7	8	9	9	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	90	

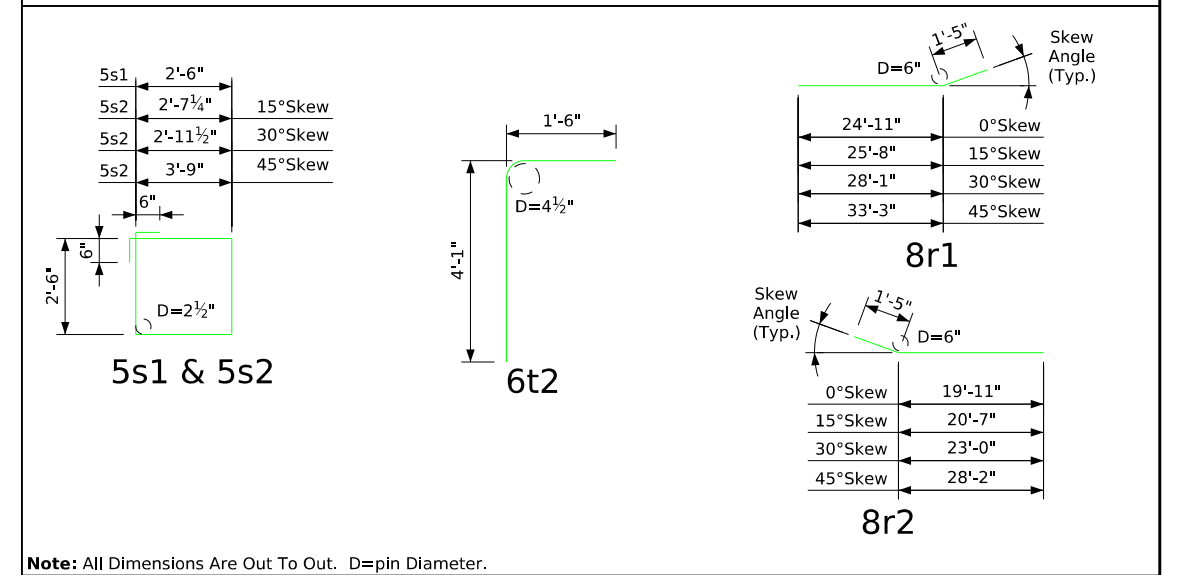
ESTIMATED QUANTITIES - ONE ABUT. - 30°Skew

Location	Unit	Quantity									
Bridge Length		70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Structural Concrete (Bridge)	c.y.	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	
Reinforcing Steel, Epoxy-Coated	lbs.	2342	2342	2342	2342	2342	2342	2352	2340	2340	
Steel Piling HP 10x24	no.	7	7	7	7	7	7	8	9	9	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	90	

ESTIMATED QUANTITIES - ONE ABUT. - 45°Skew

Location	Unit	Quantity									
Bridge Length		70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"	
Structural Concrete (Bridge)	c.y.	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	
Reinforcing Steel, Epoxy-Coated	lbs.	2723	2723	2723	2723	2723	2723	2723	2723	2711	
Steel Piling HP 10x24	no.	9	9	9	9	9	9	9	9	10	
Prebored Holes	ft.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	100	

BENT BAR DETAILS



Latest Revision Date

Approved by Bridge Engineer

IOWA | DOT

Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

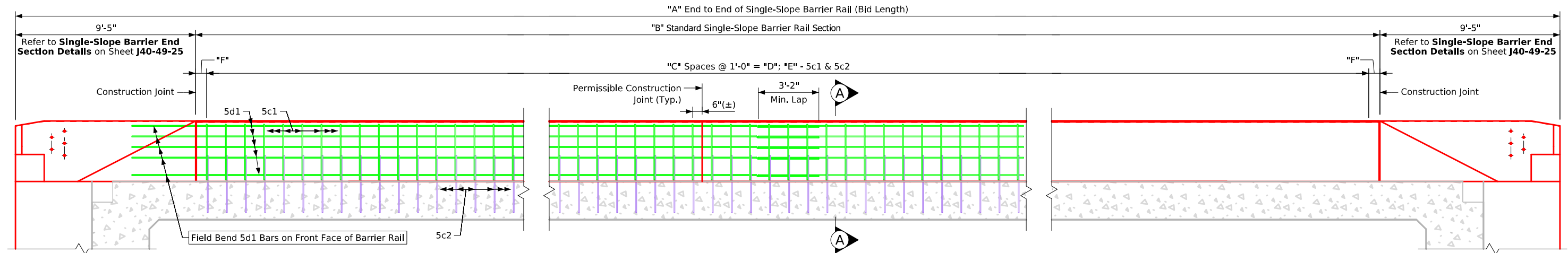
July, 2025

Abutment General Details -
Steel Piling

J40-46-25

Table of Single-Slope Barrier Rail Dimensions and Numbers

Bridge Length	70'-0				80'-0				90'-0				100'-0				110'-0				120'-0				130'-0				140'-0				150'-0							
Skew (Degrees)	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45
Dimension or Number	A (ft.-in.)	81'-0	81'-1½	81'-5½	82'-3	91'-0	89'-1½	91'-5½	92'-3	101'-0	101'-1½	81'-5½	102'-3	111'-0	111'-1½	111'-5½	112'-3	121'-0	121'-1½	121'-5½	82'-3	131'-0	131'-1½	131'-5½	132'-3	141'-0	141'-1½	141'-5½	142'-3	151'-0	151'-1½	151'-5½	152'-3	161'-0	161'-1½	161'-5½	162'-3			
	B (ft.-in.)	62'-2	62'-3¾	62'-7½	63'-5	72'-2	72'-3¾	72'-7½	73'-5	82'-2	82'-3¾	82'-7½	83'-5	92'-2	92'-3¾	92'-7½	93'-5	102'-2	102'-3¾	102'-7½	103'-5	112'-2	112'-3¾	112'-7½	113'-5	122'-2	122'-3¾	122'-7½	123'-5	132'-2	132'-3¾	132'-7½	133'-5	142'-2	142'-3¾	142'-7½	143'-5			
	C	61	61	62	62	71	71	72	72	81	81	82	82	91	91	92	92	101	101	102	102	111	111	112	112	121	121	122	122	131	131	132	132	141	141	142	142			
	D (ft.-in.)	61'-0	61'-0	62'-0	62'-0	71'-0	71'-0	72'-0	72'-0	81'-0	81'-0	82'-0	82'-0	91'-0	91'-0	92'-0	92'-0	101'-0	101'-0	102'-0	102'-0	111'-0	111'-0	112'-0	112'-0	121'-0	121'-0	122'-0	122'-0	131'-0	131'-0	132'-0	132'-0	141'-0	141'-0	142'-0	142'-0			
	E	62	62	63	63	72	72	73	73	82	82	83	83	92	92	93	93	102	102	103	103	112	112	113	113	122	122	123	123	132	132	133	133	142	142	143	143			
	F (in.)	7	7½	3¾	8½	7	7½	3¾	8½	7	7 5/8	3 3/4	8½	7	7½	3¾	8½	7	7½	3¾	8½	7	7½	3¾	8½	7	7½	3¾	8½	7	7½	3¾	8½	7	7½	3¾	8½	7	7½	3¾



Elevation of Single-Sloped Barrier Rail

Single-slope 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.

The concrete single-sloped barrier rail is to be bid on a lineal foot basis. The number of lineal feet of barrier rail installed will be paid for at the contract price per lineal foot based on plan quantities. Price bid for **Concrete Barrier Rail** 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.

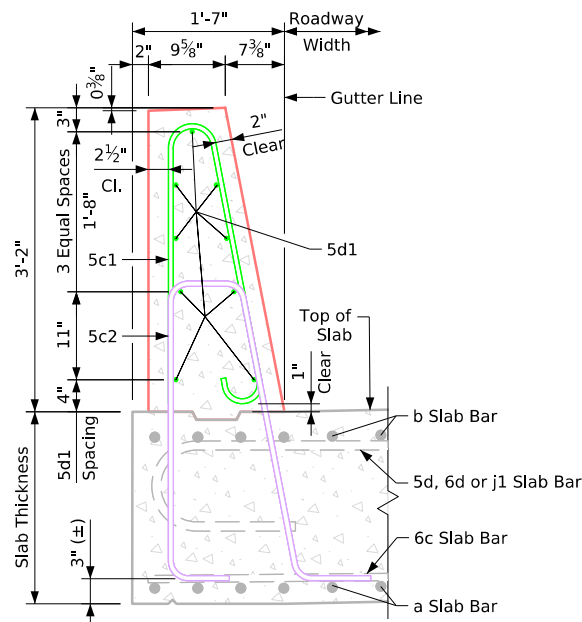
If conduit is required in this plan the rigid steel conduit, junction boxes and fittings including labor and any additional work to do the installation is considered incidental to the cost of the railing.

The joint sealer shall be light gray nonsag latex caulking sealer marketed for outdoor use. No testing or certification is required.

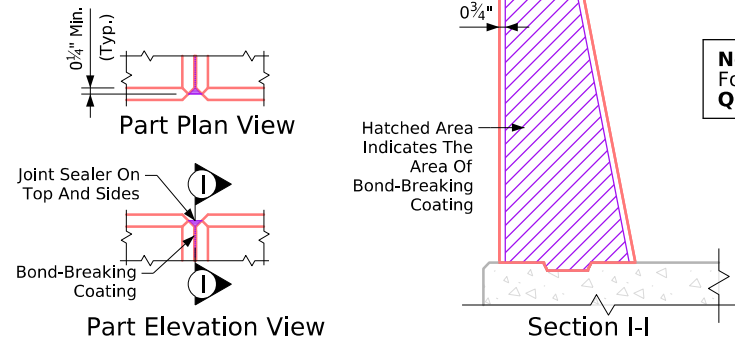
Top of the barrier rail is to be parallel to the theoretical centerline grade.
 Cross sectional area of the standard section of the barrier rail = 3.5 square feet.

All Single-sloped barrier rail reinforcing steel is to be either epoxy coated or stainless steel as shown or noted. The stainless steel reinforcing steel shall be deformed bar Grade 60 meeting the requirements of **Materials I.M.452**.

Concrete Single-sloped 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 Specification**. Cast-in-place barrier rails shall use **Class C mix**. Class D concrete is not permitted for concrete single-sloped barrier rails (cast-in-place or slipformed method).



Part Section A-A



Barrier Rail Joint Details

Note:
 For Rail Single-Slope Barrier -
 Quantities on Sheet **J40-48-25**.

Latest Revision Date Approved by Bridge Engineer	IOWA DOT
	Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025
	Rail Single-Slope Barrier - Details

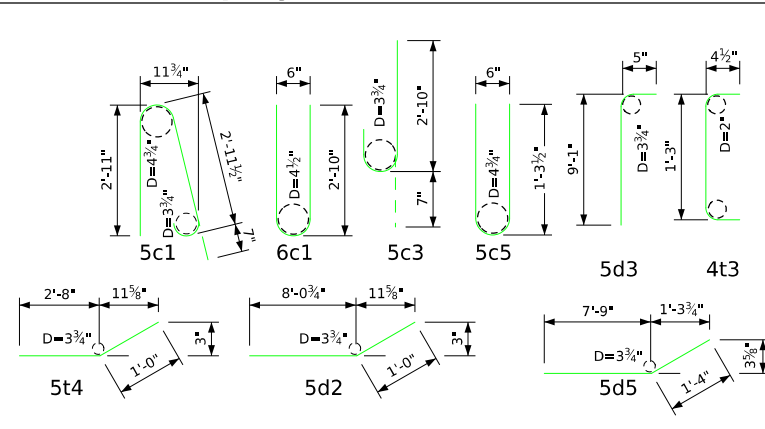
Epoxy Reinforcing Steel - Two Barrier Rails

Bridge Length				70'-0"			80'-0"			90'-0"			100'-0"			110'-0"			120'-0"			130'-0"			140'-0"			150'-0"											
Section	Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight									
2 Std. Sec.	5c1	Vertical		124	6'-8"	862	144	6'-8"	1001	166	6'-8"	1154	186	6'-8"	1293	206	6'-8"	1432	226	6'-8"	1507	246	6'-8"	1640	266	6'-8"	1850	286	6'-8"	1989									
	5d1	Long.		36	36'-6"	1371	54	28'-10"	1624	54	32'-1"	1807	54	35'-5"	1995	54	38'-9"	2182	72	32'-4"	2428	72	34'-10"	2616	72	37'-4"	2804	72	39'-10"	2991									
4 End. Sec.	6c1	Rail Vertical		48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427	48	5'-11"	427									
	5c3	Rail Vertical (Traffic Face)		12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43	12	3'-5"	43									
	5c5	Rail Vertical (End)		16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51	16	3'-1"	51									
	5d1	Rail Horiz (Back Face)		24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227	24	9'-1"	227									
	5d2	Rail Horiz (Traffic Face)		12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114	12	9'-1"	114									
	5d3	Rail Horiz (Traffic Face)		12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120	12	9'-6"	120									
	5d4	Rail Horiz (Traffic Face)		8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52	8	6'-3"	52									
	5d5	Rail Horiz (Top)		8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76	8	9'-1"	76									
	4t3	Rail Abut Wing Tie Bars		24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32	24	2'-0"	32									
	5t4	Wing Horiz (Tie Bars)		8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31	8	3'-8"	31									
Epoxy Reinforced Total Weight (lbs)				Total	3406			Total	3798			Total	4134			Total	4461			Total	4787			Total	5108			Total	5429			Total	5827			Total	6153		

Stainless Steel Reinforcing Steel - Two Barrier Rails

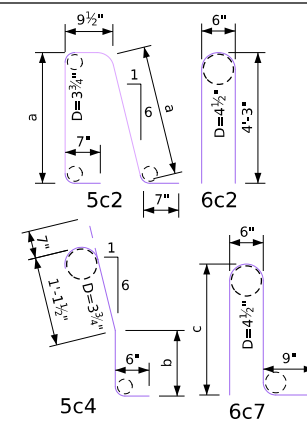
Bridge Length				70'-0"			80'-0"			90'-0"			100'-0"			110'-0"			120'-0"			130'-0"			140'-0"			150'-0"											
Section	Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight									
2 Std. Sec.	5c2	Vertical		124	6'-8"	862	144	6'-9"	1014	166	6'-11"	1198	186	7'-2"	1390	206	7'-4"	1576	226	7'-7"	1788	246	7'-9"	1988	266	8'-0"	2220	286	8'-3"	2461									
4 End. Sec.	6c2	Rail, Vertical		20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270	20	9'-0"	270									
	5c4	Rail Vertical (Traffic Face)		24	3'-3"	81	24	3'-4"	83	24	3'-5"	86	24	3'-6"	88	24	3'-7"	90	24	3'-8"	92	24	3'-10"	96	24	3'-11"	98	24	4'-0"	100									
	5c6	Rail, Vertical (End)		32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189	32	5'-8"	189									
	6c7	Rail, Vertical (Slab/Abut.)		28	6'-3"	263	28	6'-5"	270	28	6'-7"	277	28	6'-9"	284	28	6'-11"	291	28	7'-2"	301	28	7'-5"	312	28	7'-7"	319	28	7'-10"	329									
Stainless Steel Reinforced Total Weight (lbs)				Total	1665			Total	1826			Total	2020			Total	2221			Total	2416			Total	2640			Total	2855			Total	3096			Total	3349		

Epoxy Bent Bar Details



Note: All Dimensions Are Out To Out. D = Pin Diameter.

Stainless Bent Bar Details



Note: All Dimensions Are Out To Out. D = Pin Diameter.

Bridge	5c2		5c4		6c7	
	a	Length	b	Length	c	Length
70'-0"	2'-4"	6'-8"	1'-0"	3'-3"	2'-6"	6'-3"
80'-0"	2'-4 3/4"	6'-9"	1'-0 3/4"	3'-4"	2'-6 3/4"	6'-5"
90'-0"	2'-5 1/4"	6'-11"	1'-1 3/4"	3'-5"	2'-7 3/4"	6'-7"
100'-0"	2'-7"	7'-2"	1'-3"	3'-6"	2'-9"	6'-9"
110'-0"	2'-8"	7'-4"	1'-4"	3'-7"	2'-10"	6'-11"
120'-0"	2'-9 1/2"	7'-7"	1'-5 1/2"	3'-8"	2'-11 1/2"	7'-2"
130'-0"	2'-10 3/4"	7'-9"	1'-6 3/4"	3'-10"	3'-0 3/4"	7'-5"
140'-0"	3'-0"	8'-0"	1'-8"	3'-11"	3'-2"	7'-7"
150'-0"	3'-1 1/2"	8'-3"	1'-9 1/2"	4'-0"	3'-3 1/2"	7'-10"

Concrete Placement Summary

Bridge Length	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
Standard Section* 2 x "B" @ 0.1301 cu.yd. per ft.	8.2	9.6	10.9	12.2	13.5	14.8	16.1	17.4	18.7
End Section 4 @ 1.00 cu.yd.					4.0				
Total (cu.yd.)	12.2	13.6	14.9	16.2	17.5	18.8	20.1	21.4	22.7

* For Rail Single-Slope Barrier - Dimension "B", see J40-47-25
Concrete Quantities shown are based on 45° skew bid lengths.

Concrete Barrier Rail Quantities

Bridge Length	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
Concrete Barrier Railing 0° Skew	162.0	182.0	202.0	222.0	242.0	262.0	282.0	302.0	322.0
Concrete Barrier Railing 15° Skew	162.2	182.2	202.2	222.2	242.2	262.2	282.2	302.2	322.2
Concrete Barrier Railing 30° Skew	162.9	182.9	202.9	222.9	242.9	262.9	282.9	302.9	322.9
Concrete Barrier Railing 45° Skew	164.5	184.5	204.5	224.5	244.5	264.5	284.5	304.5	324.5

Note:
For Rail Single-Slope Barrier -
Details, see Sheet J40-47-25.

Latest Revision Date

Approved by Bridge Engineer

IOWA | DOT

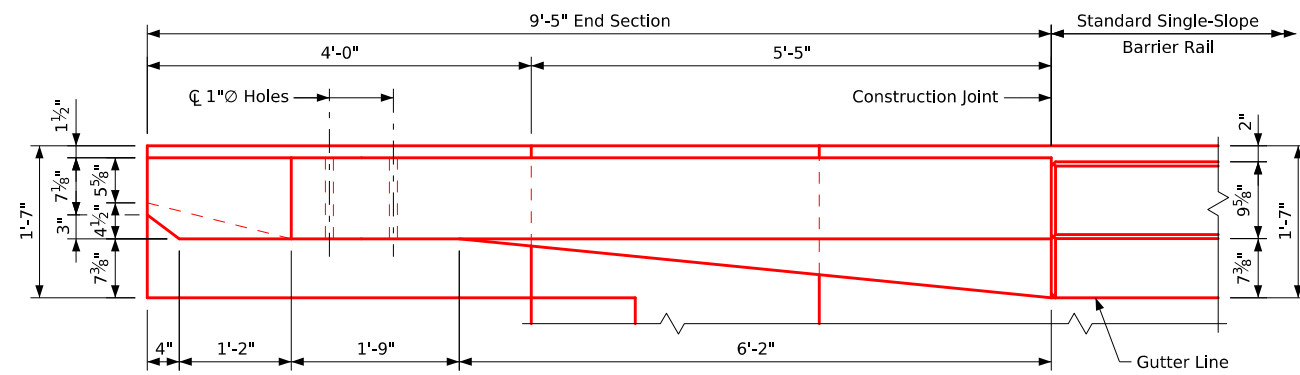
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

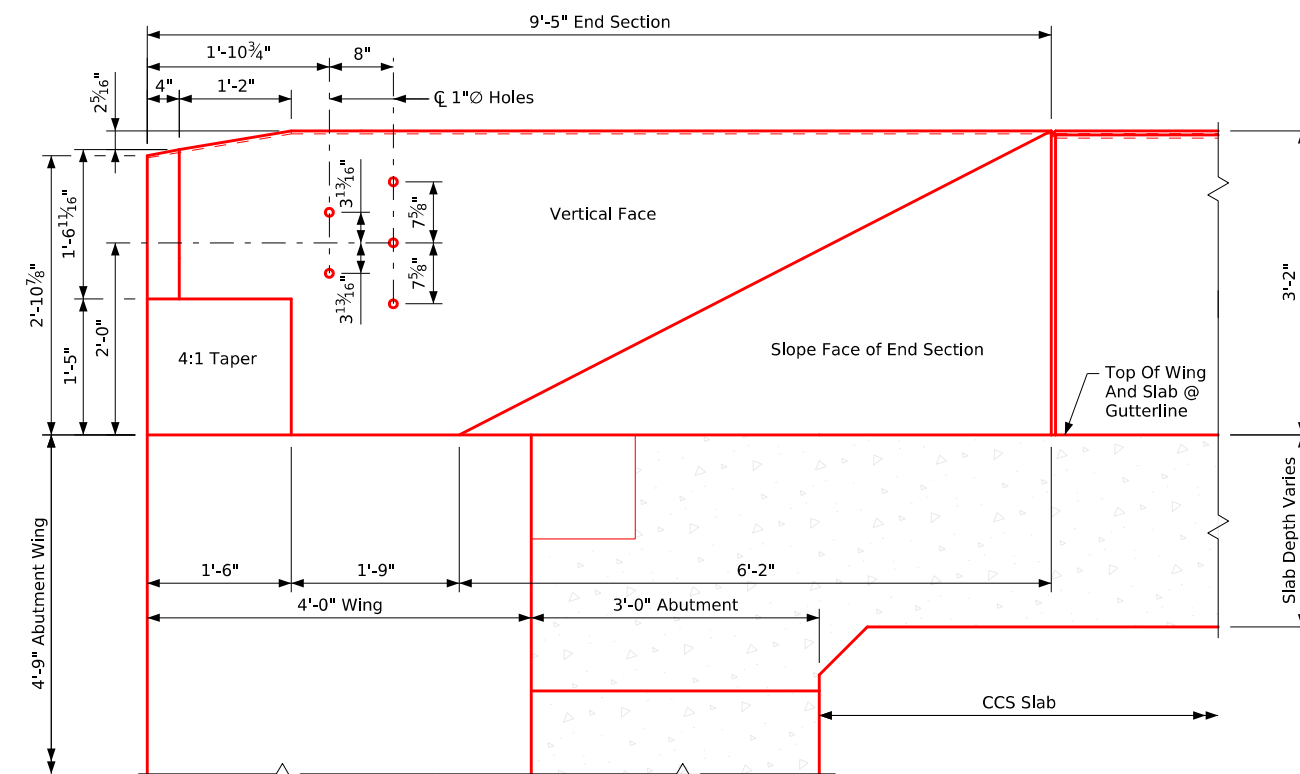
Rail Single-Slope
Barrier - Quantities

J40-48-25



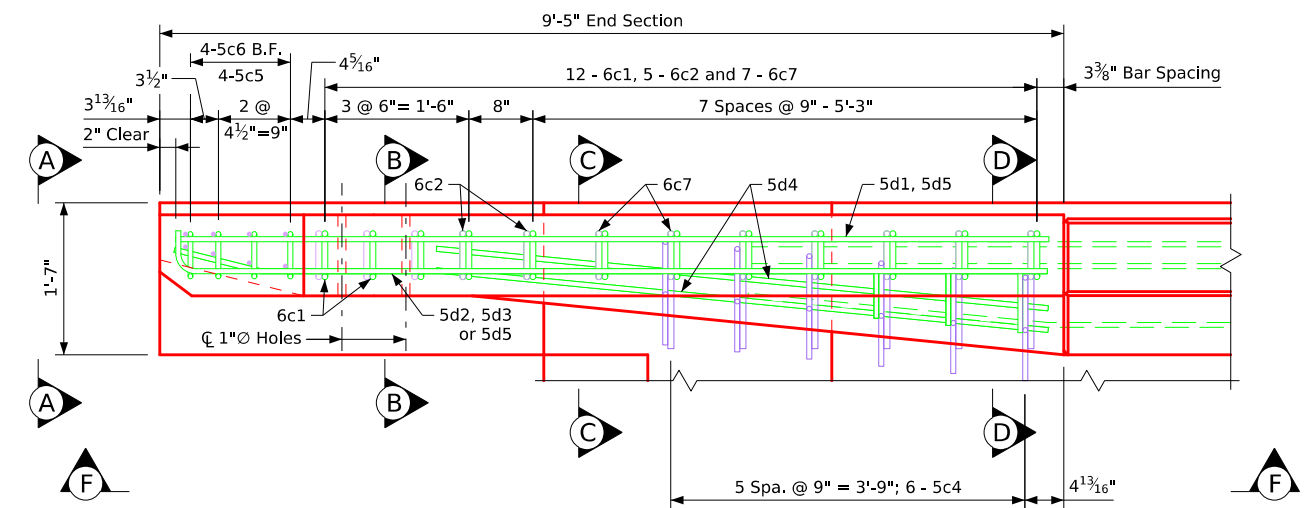
Part Plan View

Provide five holes formed with 1" diameter plastic conduit. Cost to be included in price of Bid for **Concrete Barrier Rail**.

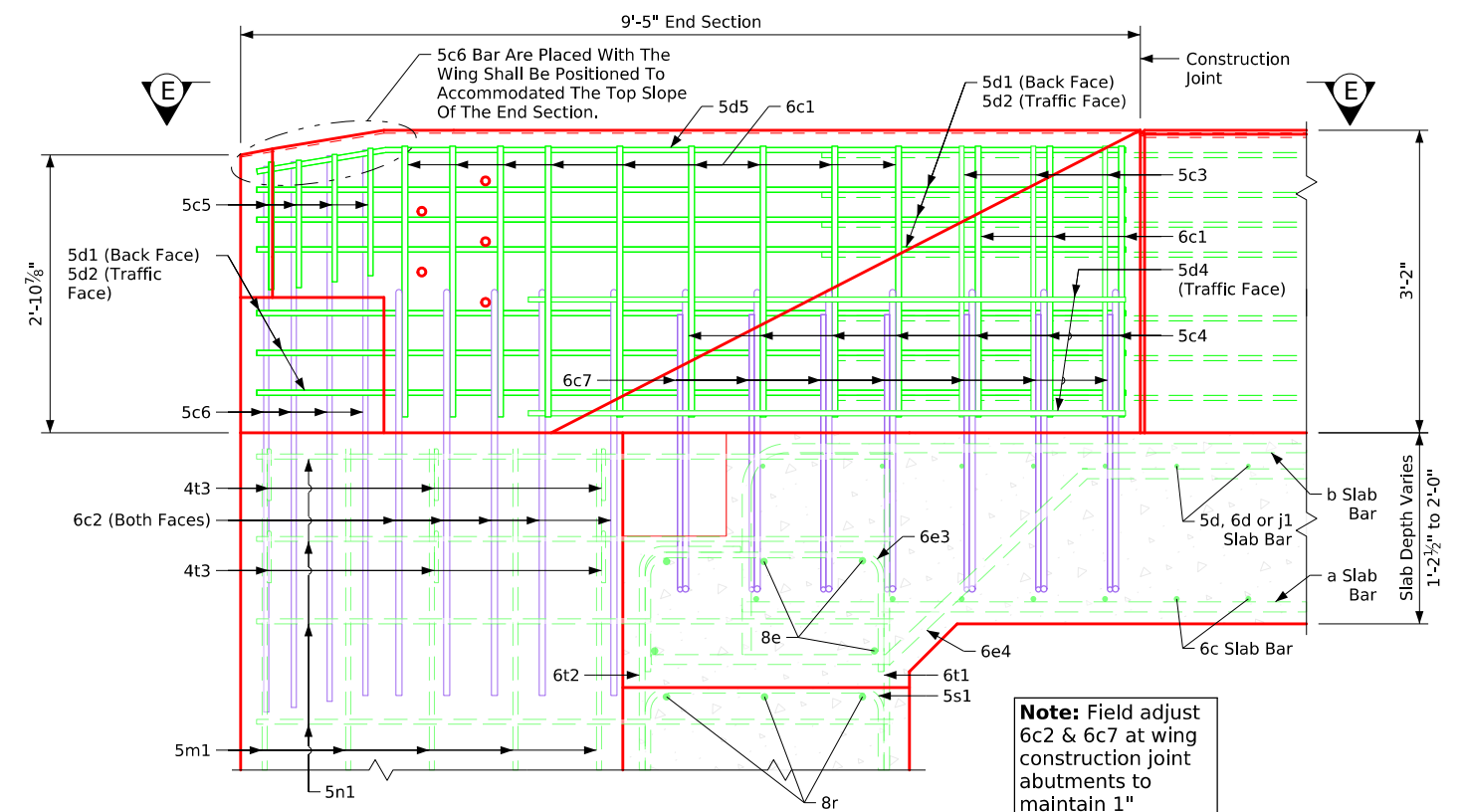


Part Elevation View

Note: 4t3 placement: Six bars each at the top two rows of the 5n1 bars in the abutment wing to provide construction tie locations for vertical barrier bars.
 Construction joint between the top of the abutment wing and the single-slope barrier rail is roughened concrete.
 6c2, 5c4, 5c6, 6c7, 5t4 and 4t3 bars are to be placed with the abutment wing.
 Dashed lines below the top of the wing indicate abutment wing and slab reinforcing steel. For additional details, see Sheet **J40-20-25**.



Part View E-E

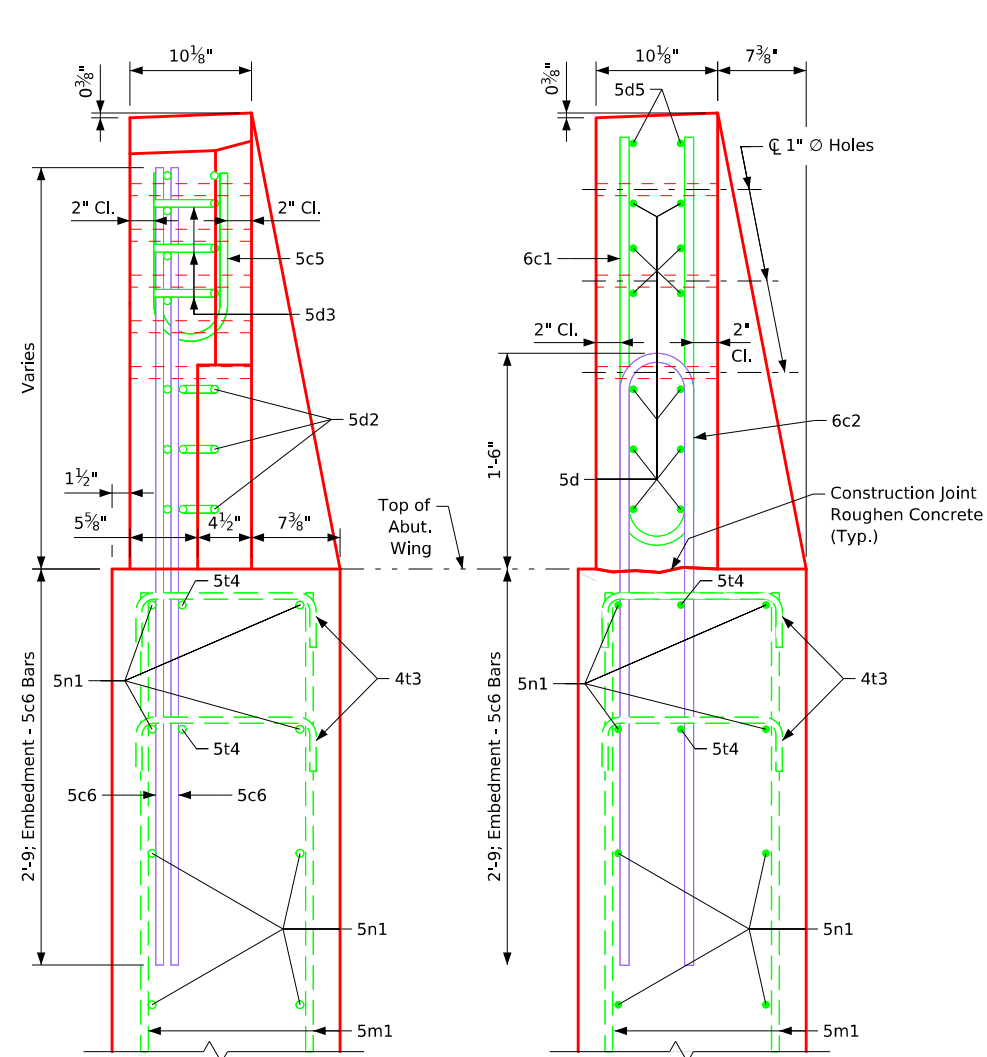


Part View F-F

Note: Field adjust 6c2 & 6c7 at wing construction joint abutments to maintain 1" minimum cover.

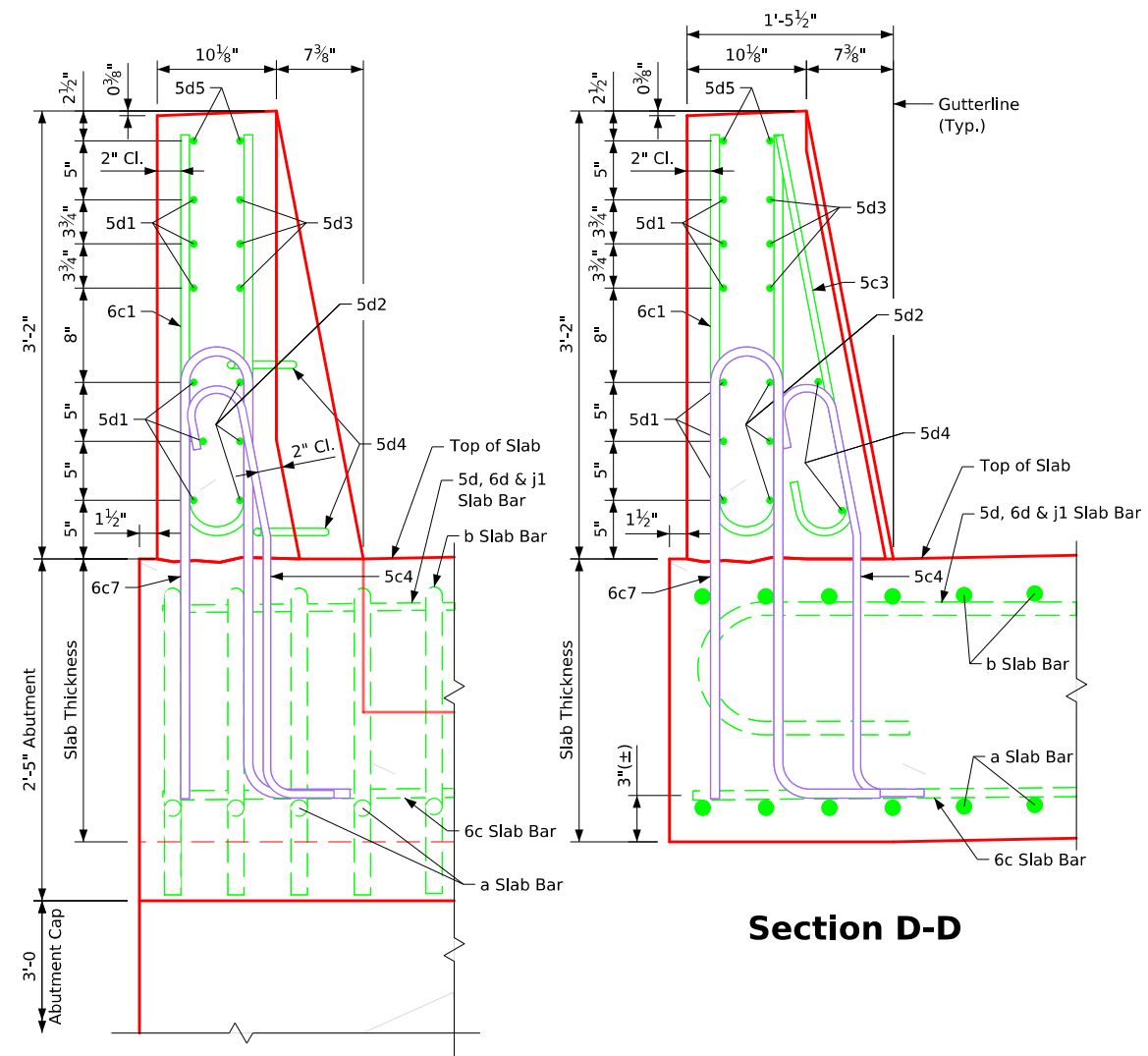
Note: For section details, see Sheet **J40-50-25**

Latest Revision Date Approved by Bridge Engineer 	IOWA DOT Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge July, 2025	
	Rail Single-Slope Barrier - End Section Details (1 of 2)	J40-49-25



View A-A

Section B-B



Section D-D

Note: For End Section locations, see Sheet **J40-49-25**.

Note: For barrier rail end section quantities, see Sheet **J40-48-25**.

Note: For additional barrier-to-abutment wing details, see Sheet **J40-20-25**.


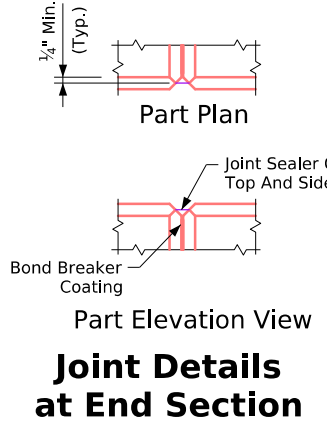
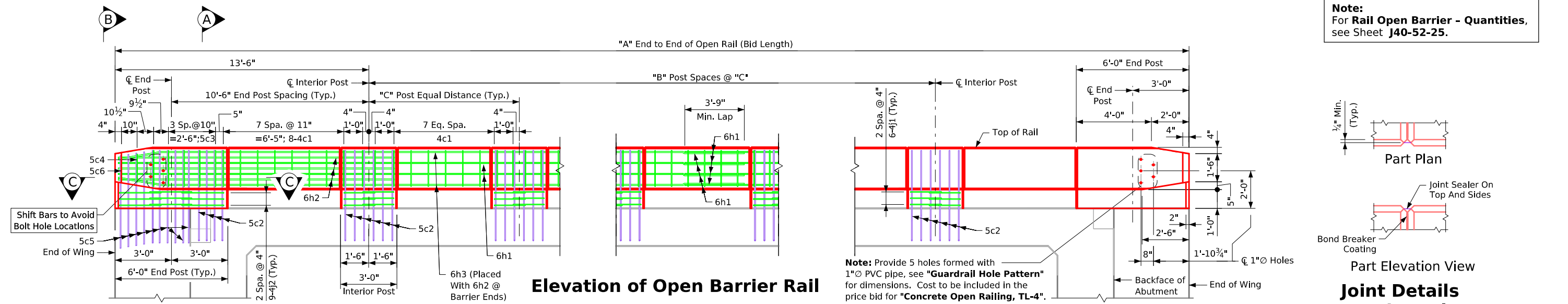
Latest Revision Date  Approved by Bridge Engineer	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
	July, 2025	
Rail Single-Slope Barrier - End Section Details (2 of 2)		J40-50-25

Table of Open Rail Dimensions and Numbers

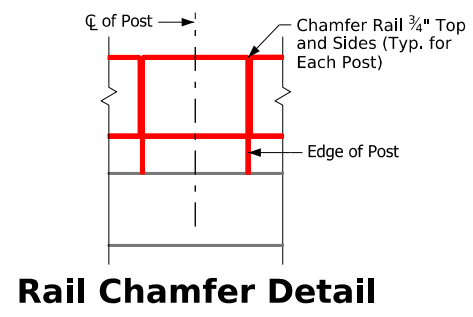
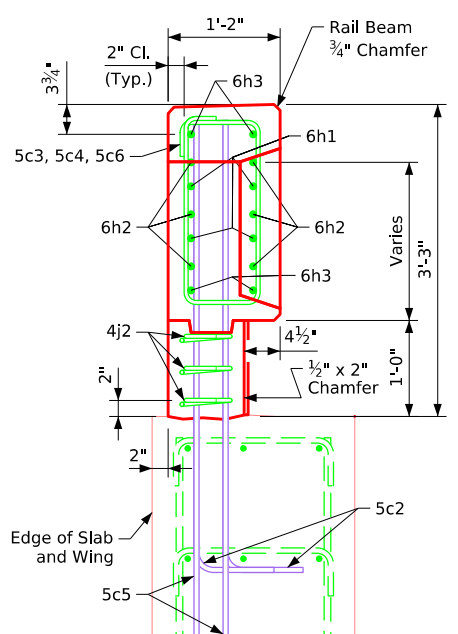
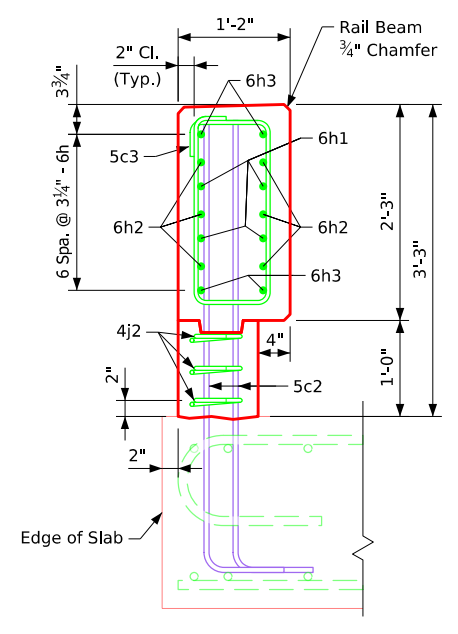
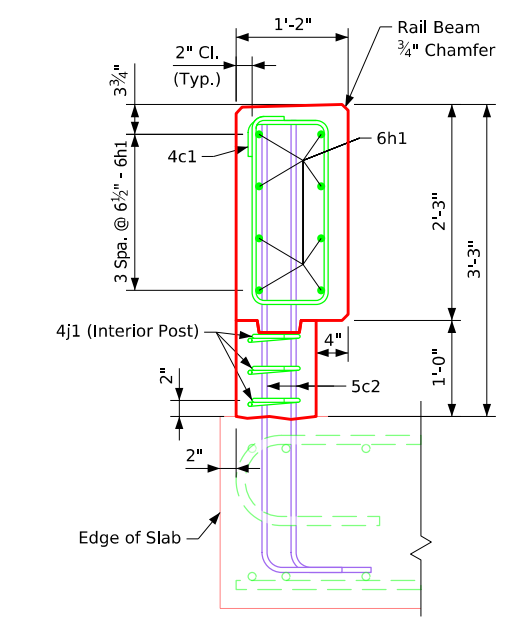
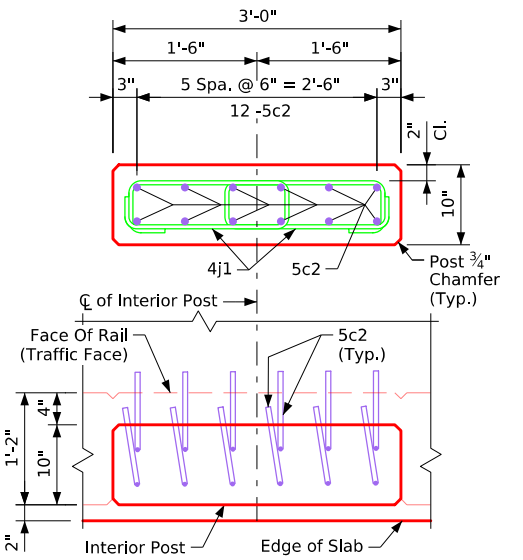
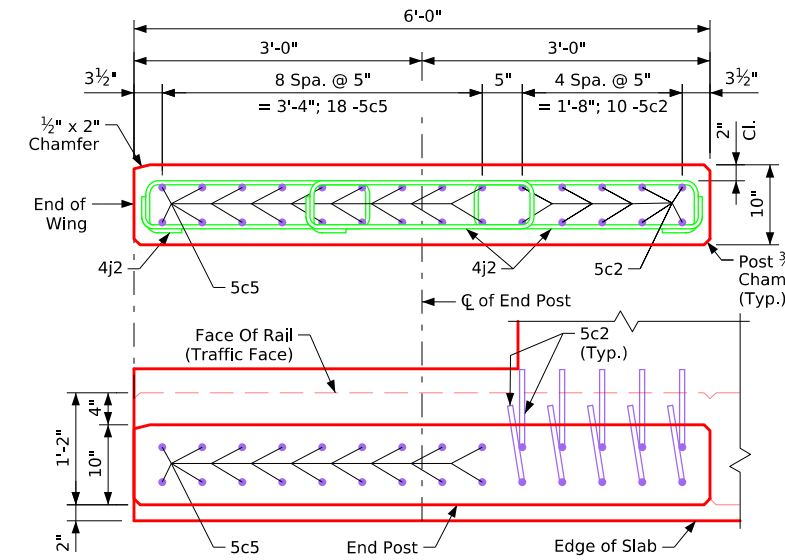
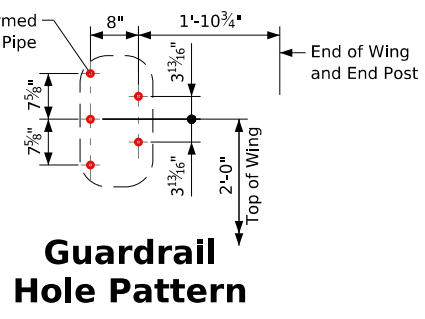
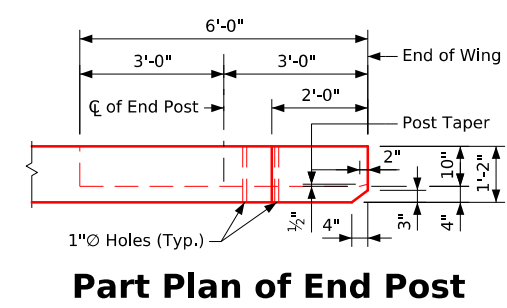
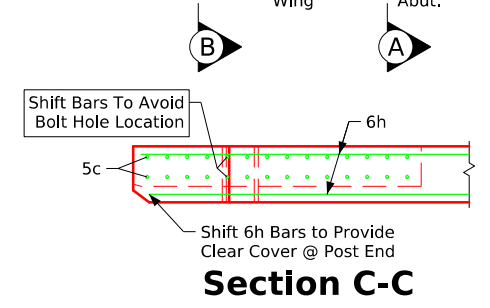
Bridge Length	70'-0"				80'-0"				90'-0"				100'-0"				110'-0"				120'-0"				130'-0"				140'-0"				150'-0"				
	Skew	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45	0	15	30	45				
Dim. or Number	A(ft.-in.)	81'-0"	81'-1 1/4"	81'-5 1/2"	82'-3"	91'-0"	91'-1 1/4"	91'-5 1/2"	92'-3"	101'-0"	101'-1 1/4"	101'-5 1/2"	102'-3"	111'-0"	111'-1 1/4"	111'-5 1/2"	112'-3"	121'-0"	121'-1 1/4"	121'-5 1/2"	122'-3"	131'-0"	131'-1 1/4"	131'-5 1/2"	132'-3"	141'-0"	141'-1 1/4"	141'-5 1/2"	142'-3"	151'-0"	151'-1 1/4"	151'-5 1/2"	152'-3"	161'-0"	161'-1 1/4"	161'-5 1/2"	162'-3"
	B	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	16
	C(ft.-in.)	7'-8 3/8"	7'-8 3/4"	7'-9 3/8"	7'-10 3/4"	8'-0"	8'-0 1/4"	8'-0 3/4"	8'-1 1/4"	8'-2 1/4"	8'-2 3/4"	8'-3 1/4"	8'-4 1/4"	8'-4 3/4"	8'-4 3/4"	8'-4 3/8"	8'-5 3/8"	8'-6 1/4"	8'-6 1/2"	8'-6 3/8"	8'-7"	8'-7 1/8"	8'-8"	8'-8 1/8"	8'-8 1/2"	8'-9 1/4"	8'-9 3/8"	8'-9 3/8"	8'-10 3/8"	8'-10 3/4"	8'-10 3/4"	8'-10 3/4"	8'-11 3/8"	8'-11 3/4"	8'-11 3/4"	8'-11 3/4"	8'-11 3/8"

Note:
For Rail Open Barrier - Quantities, see Sheet **J40-52-25**.

"A" End to End of Open Rail (Bid Length)



Note: Provide 5 holes formed with 1" PVC pipe, see "Guardrail Hole Pattern" for dimensions. Cost to be included in the price bid for "Concrete Open Railing, TL-4".



Latest Revision Date	Approved by Bridge Engineer	IOWA DOT
Standard Design-40'-0" Roadway, 3 Span Bridge		
Continuous Concrete Slab Bridge		
July, 2025		
Rail Open Barrier - Details	J40-51-25	

Epoxy Reinforcing Steel - Two Barrier Rails

Bridge Length			70'-0"			80'-0"			90'-0"			100'-0"			110'-0"			120'-0"			130'-0"			140'-0"			150'-0"		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight			
4c1	Rail Ties		176	6'-3"	735	196	6'-3"	818	216	6'-3"	902	236	6'-3"	985	256	6'-3"	1069	276	6'-3"	1152	296	6'-3"	1236	316	6'-3"	1319	336	6'-3"	1403
5c3	End Posts, Tie		20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136	20	6'-6"	136
5c4	End Post, Tie		4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26	4	6'-2"	26
5c6	End Post, Tie		4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22	4	5'-2"	22
6h1	Rail, Horizontal		32	29'-11"	1438	32	33'-3"	1598	32	36'-7"	1758	32	39'-11"	1919	48	33'-5"	2409	48	35'-11"	2589	48	38'-5"	2770	64	33'-5"	3212	64	35'-6"	3412
6h2	Rail, Horizontal, Ends		24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535	24	14'-10"	535
6h3	Rail, Horizontal, Ends		16	29'-11"	719	16	33'-3"	799	16	36'-7"	879	16	39'-11"	959	16	33'-5"	803	16	35'-11"	862	16	38'-5"	923	16	33'-5"	803	16	35'-6"	853
4j1	Interior Post, Tie		96	4'-9"	305	108	4'-9"	343	120	4'-9"	381	132	4'-9"	419	144	4'-9"	457	156	4'-9"	495	168	4'-9"	533	180	4'-9"	571	192	4'-9"	609
4j2	End Post, Tie		36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150	36	6'-3"	150
Total (lbs)			4066			4427			4789			5151			5607			5967			6331			6774			7146		

Note: Reinforcing quantities shown are based on 45 degree skew bid lengths.

Stainless Steel Reinforcing Steel - Two Barrier Rails

Bridge Length			70'-0"			80'-0"			90'-0"			100'-0"			110'-0"			120'-0"			130'-0"			140'-0"			150'-0"		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight			
5c2	Posts, Vertical		232	4'-11"	1190	256	5'-0"	1335	280	5'-1"	1485	304	5'-2"	1638	328	5'-3"	1796	352	5'-5"	1989	376	5'-6"	2157	400	5'-7"	2329	424	5'-9"	2543
5c5	End Posts, Vertical		72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382	72	5'-1"	382
Total (lbs)			1572			1717			1867			2020			2178			2371			2539			2711			2925		

Concrete Placement Quantities

Bridge Length	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
One Rail Qtys (cu. yd.)	8.0	9.0	9.9	10.9	11.9	12.9	13.8	14.8	15.8
Quant Interior Posts (One Rail)	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.6
Quantity Two End Posts	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total Conc. Qtys -Two Rails (cu. yd.)	18.2	20.3	22.5	24.6	26.7	28.9	31.0	33.1	35.4

Note: Concrete quantities shown are based on 45 degree skew bid lengths.

Concrete Open Rail Quantities

Bridge Length	Unit	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"	120'-0"	130'-0"	140'-0"	150'-0"
Concrete Open Railing TL-4 0 deg skew	L.F.	162.0	182.0	202.0	222.0	242.0	262.0	282.0	302.0	322.0
Concrete Open Railing TL-4 15 deg skew	L.F.	162.2	182.2	202.2	222.2	242.2	262.2	282.2	302.2	322.2
Concrete Open Railing TL-4 30 deg skew	L.F.	162.9	182.9	202.9	222.9	242.9	262.9	282.9	302.9	322.9
Concrete Open Railing TL-4 45 deg skew	L.F.	164.5	184.5	204.5	224.5	244.5	264.5	284.5	304.5	324.5

Open Rail Notes:

The open rail system meets **Test Level 4 (TL-4)** requirements according to the **Manual for Assessing Safety Hardware (MASH)** and includes provisions for a 3" future wearing surface height.

All barrier rail reinforcing steel is to be either epoxy-coated or stainless steel, as shown or noted. Stainless steel reinforcing steel shall be deformed bar, Grade 60, meeting the requirements of **Materials I.M. 452**.

Unless otherwise noted or shown, the minimum clear distance from the face of concrete to the nearest reinforcing bar shall be 2".

The cost of the joint sealer and bond breaker shall be considered incidental to the price bid item **"Concrete Open Rail, TL-4."**

The concrete open rail is to be bid on a linear foot basis, measured from end to end of the rail. The number of linear feet of open rail installed will be paid for at the contract price per linear foot.

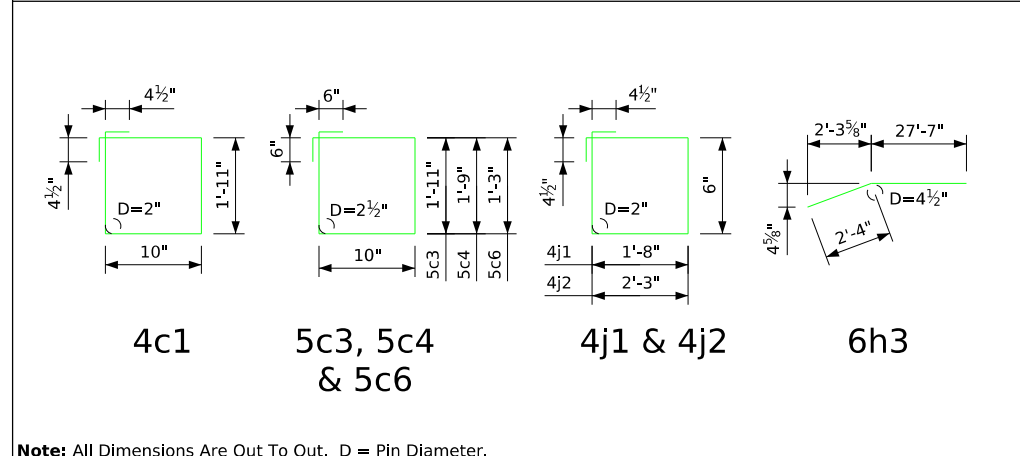
The price bid for **"Concrete Open Rail, TL-4"** shall be full compensation for furnishing all materials (excluding reinforcing steel) and for all equipment and labor required to construct the rail in accordance with these plans and current specifications.

All open rail concrete is to be **Class C**.

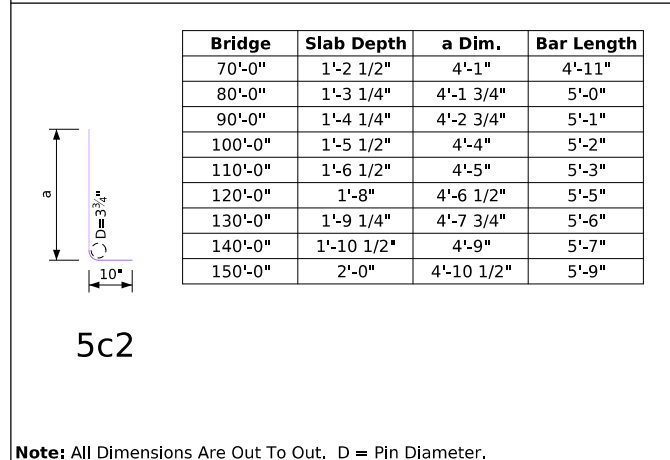
The joint sealer shall be a light gray, non-sag latex caulking sealer marketed for outdoor use. No testing or certification is required.

The top of the open rail shall be parallel to the theoretical C grade.

Epoxy Bent Bar Details

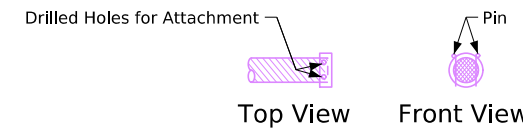


Stainless Bent Bar Details

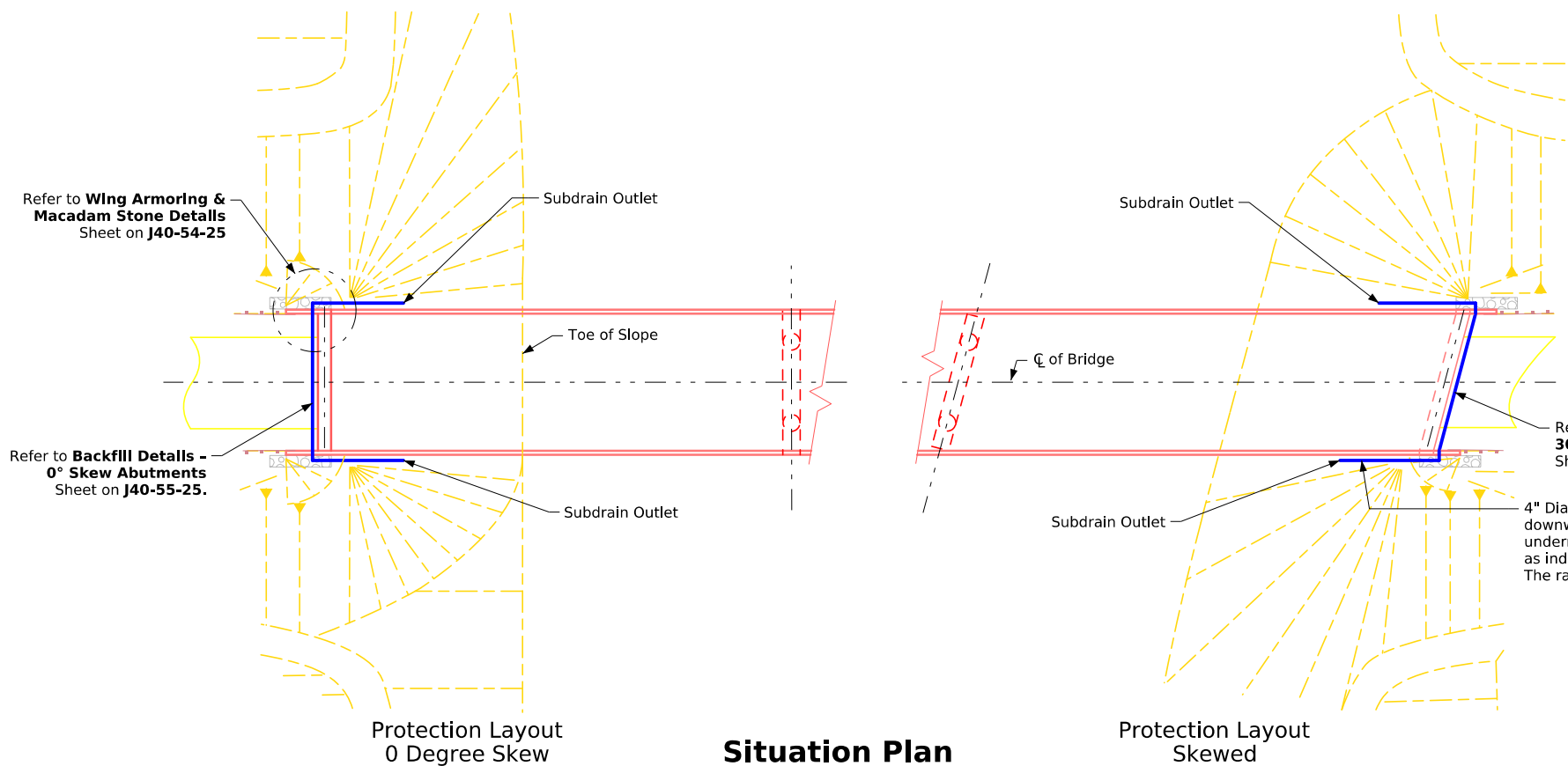


Note:
For **Rail Open Barrier - Details**,
see Sheet **J40-51-25**.

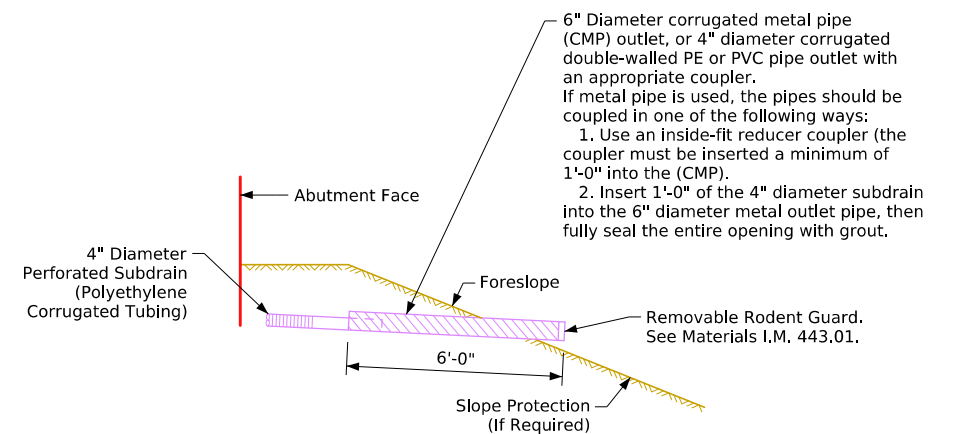
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Removable Rodent Guard Details



Situation Plan
Refer to **Situation Plan** for North arrow.



Typical Subdrain Outlet Details

6" Diameter corrugated metal pipe (CMP) outlet, or 4" diameter corrugated double-walled PE or PVC pipe outlet with an appropriate coupler.
If metal pipe is used, the pipes should be coupled in one of the following ways:
1. Use an inside-fit reducer coupler (the coupler must be inserted a minimum of 1'-0" into the (CMP)).
2. Insert 1'-0" of the 4" diameter subdrain into the 6" diameter metal outlet pipe, then fully seal the entire opening with grout.

Refer to **Backfill Details - 15°, 30°, 45° Skew Abutments** Sheet on **J40-56-25**
4" Diameter perforated subdrain to be sloped downward from the C of the roadway and underneath the slope protection to the outlet as indicated.
The rate of slope shall not be flatter than 2%.

Refer to **Wing Armoring & Macadam Stone Details** Sheet on **J40-54-25**
Refer to **Backfill Details - 0° Skew Abutments** Sheet on **J40-55-25**.

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Macadam Stone Wing Armoring Notes:

Macadam stone shall be placed along the side of the wing and abutment footing, typically at each corner of the bridge unless otherwise noted in the plans. This macadam stone shall be underlaid with engineering fabric and comply with **Article 4196.01, B, 3, of the Standard Specifications**.

The bridge berm foreslope shall be compacted and shaped as shown on these plans, 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 meet the requirements of **Article 4196.01, B, 3, of the Standard Specifications**. If the fabric is lapped, the laps shall be a minimum of one foot in length, placed in shingle fashion with the upslope lap piece on top and stapled for continuity.

The macadam stone shall comply with **Article 4122.02 of the Standard Specifications** for coarse material (no choke stone allowed).

The wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, and comply with **Section 4161 of the Standard Specifications**.

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

Payment for the bridge wing armoring shall be incidental to the price bid item **"Structural Concrete (Bridge)"** and shall include all material and labor costs to construct the wing armoring as shown in these plans.

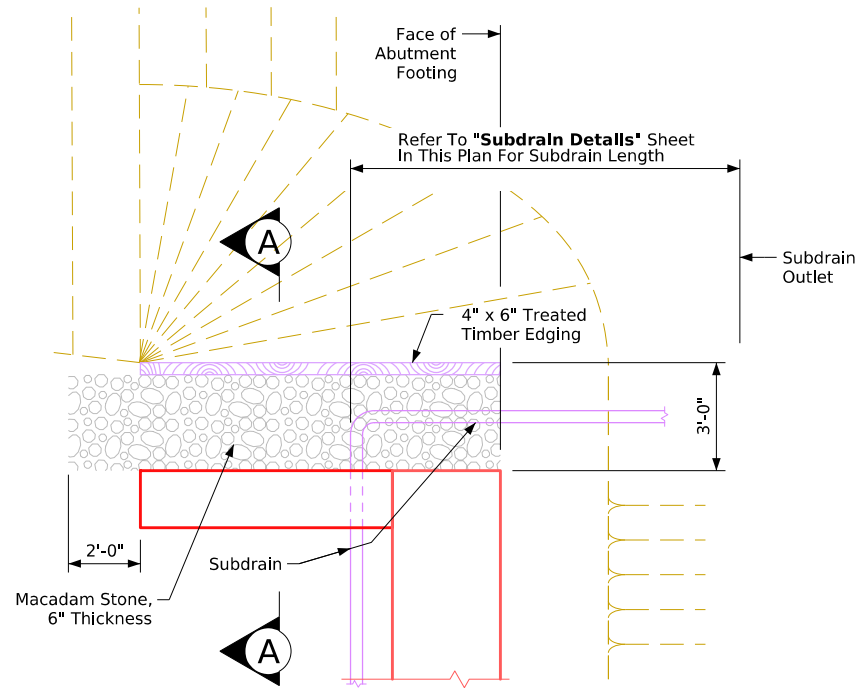
Subdrain Notes:

For details on placing all subdrains and subdrain outlets required for this structure, see **Subdrain Details** on sheet **J44-54-25** and **"Situation Plan"**

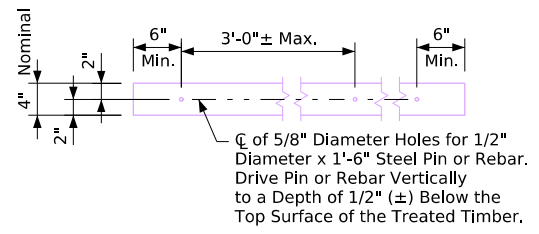
The Bridge Contractor is responsible for installing subdrains behind the abutment. The subdrains shall be 4" in diameter and comply with **Article 4143.01, B, of the Standard Specifications**. The subdrain outlet shall consist of a 6'-0" length of pipe with a removable rodent guard.

The dimensions shown for the proposed subdrains are based on the grading layout of the bridge berms. These dimensions are for estimating purposes only. Required lengths and general locations of subdrains may change due to field adjustments to the grading layout.

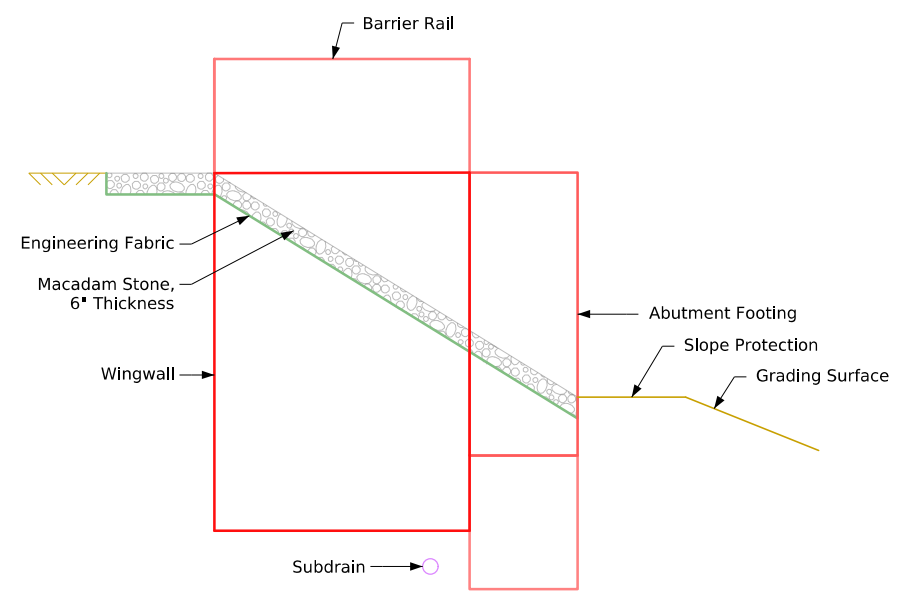
The cost for furnishing and placing the subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for **"Structural Concrete (Bridge)"**. No additional payment will be made.



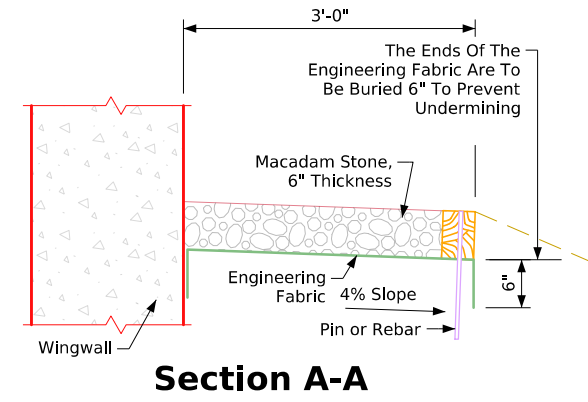
Plan View of Wing Armoring




4" x 6" Treated Timber Edging Details

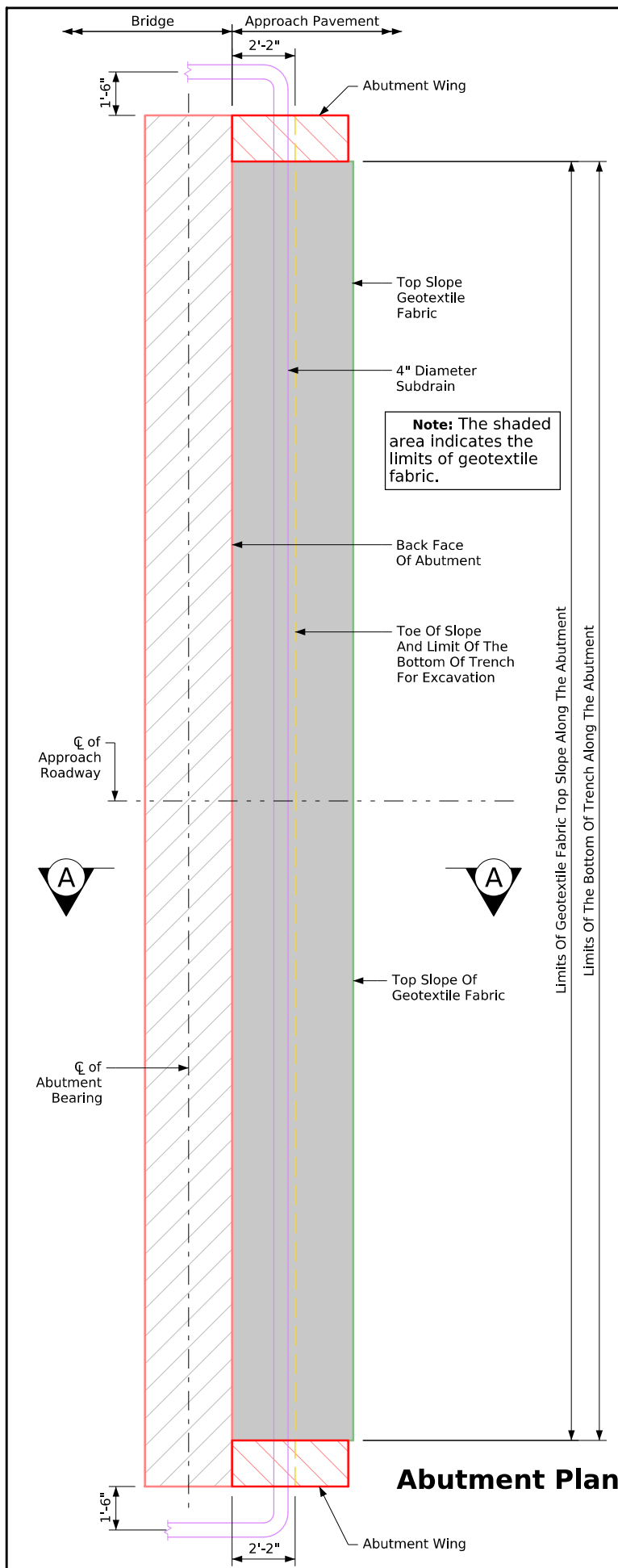


Elevation View of Wing Armoring



Section A-A

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Abutment Backfill Process:

The base of the excavation subgrade behind the abutment shall be graded with a 4% slope away from the abutment footing and a 2% cross slope towards the subdrain outlet. This grading should be completed before the installation of the geotextile and backfill material.

Once the subgrade is shaped, the geotextile fabric shall be installed according to the details shown. The fabric is to be placed at the base of the excavation and extended vertically up the abutment backwall, wing walls, and excavation face, reaching a height approximately 1 to 2 feet higher than the porous backfill, as shown in the "Backfill Details" on this sheet. The fabric strips should overlap by about 1 foot and be pinned in place. The fabric should be attached to the abutment using lath folded into the fabric and secured with shallow concrete nails. The fabric against the excavation face must also be pinned.

After the fabric is installed, the subdrain shall be placed directly on it at the toe of the rear excavation slope. A slot should be cut in the fabric where the subdrain exits near the end of the abutment wing wall.

Porous backfill shall be placed and leveled without compaction.

Next, floodable backfill shall be used, followed by surface flooding and vibratory compaction. The floodable backfill material must conform to the Standard Specifications. It should be placed in lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation, with a maximum loose lift thickness of 2 feet.

Surface flooding for each lift should start at the high point of the subdrain and proceed to the low point where the subdrain exits the fabric. Water should be applied through a 2-inch diameter hose, sprayed in 6-foot to 8-foot increments for 3 minutes per increment to ensure uniform flooding.

The placement of floodable backfill, flooding, and compaction should continue until the full thickness of the abutment backfill is completed.

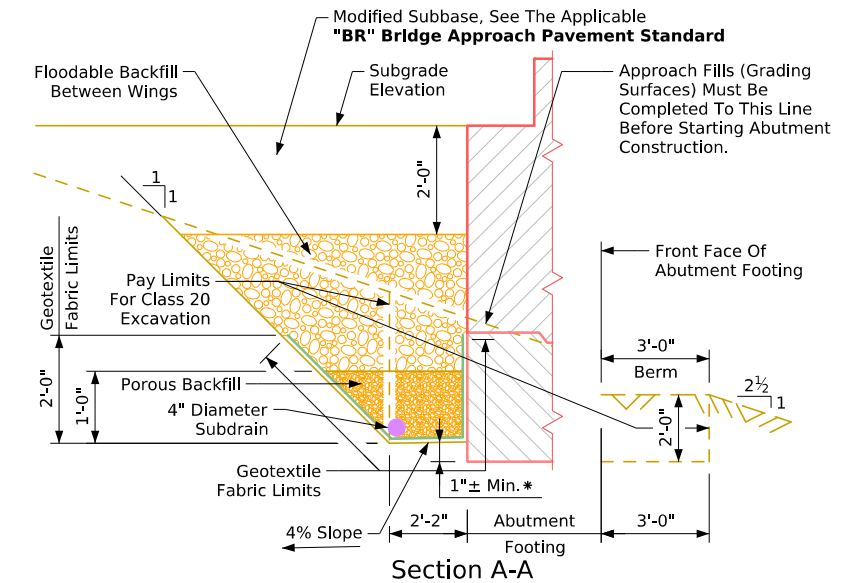
Water used for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric at the bridge abutments will not be measured separately for payment. The cost of this water shall be included in the contract unit price bid for "Structural Concrete (Bridge)".

Note:

Subdrain shall slope downward 2% from centerline approach roadway when outletting both sides of the abutment.

Subdrain shall slope downward 2% from high end when outletting at one end of the abutment.

The geotextile fabric shall be in accordance with **Article 4196.01, B, 6 of the Standard Specifications**. If the engineering fabric is lapped the laps shall be a minimum of one foot in length, shingle fashion with up slope lap piece on top and stapled for continuity.




Backfill Details

Note: Geotextile fabric shall be attached to the face of the abutment footing and wings.

* Dimension varies due to the 2% subdrain slope.

Note: For additional details not shown on this sheet, see **Subdrain Details** on Sheet **J40-53-25**.

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Abutment Backfill Process:

The base of the excavation subgrade behind the abutment shall be graded with a 4% slope away from the abutment footing and a 2% cross slope towards the subdrain outlet. This grading should be completed before the installation of the geotextile and backfill material.

Once the subgrade is shaped, the geotextile fabric shall be installed according to the details shown. The fabric is to be placed at the base of the excavation and extended vertically up the abutment backwall, wing walls, and excavation face, reaching a height approximately 1 to 2 feet higher than the porous backfill, as shown in the "Backfill Details" on this sheet. The fabric strips should overlap by about 1 foot and be pinned in place. The fabric should be attached to the abutment using lath folded into the fabric and secured with shallow concrete nails. The fabric against the excavation face must also be pinned.

After the fabric is installed, the subdrain shall be placed directly on it at the toe of the rear excavation slope. A slot should be cut in the fabric where the subdrain exits near the end of the abutment wing wall.

Porous backfill shall be placed and leveled without compaction.

Next, floodable backfill shall be used, followed by surface flooding and vibratory compaction. The floodable backfill material must conform to the Standard Specifications. It should be placed in lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation, with a maximum loose lift thickness of 2 feet.

Surface flooding for each lift should start at the high point of the subdrain and proceed to the low point where the subdrain exits the fabric. Water should be applied through a 2-inch diameter hose, sprayed in 6-foot to 8-foot increments for 3 minutes per increment to ensure uniform flooding.

The placement of floodable backfill, flooding, and compaction should continue until the full thickness of the abutment backfill is completed.

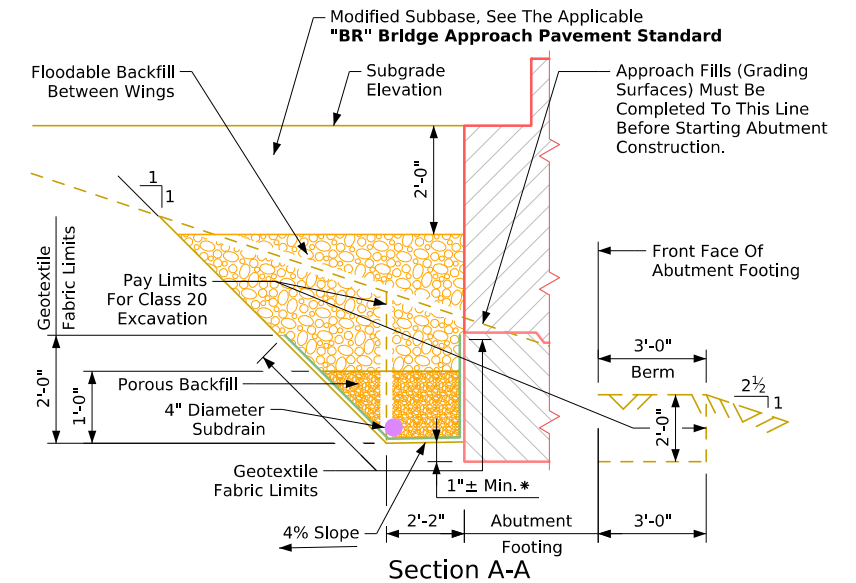
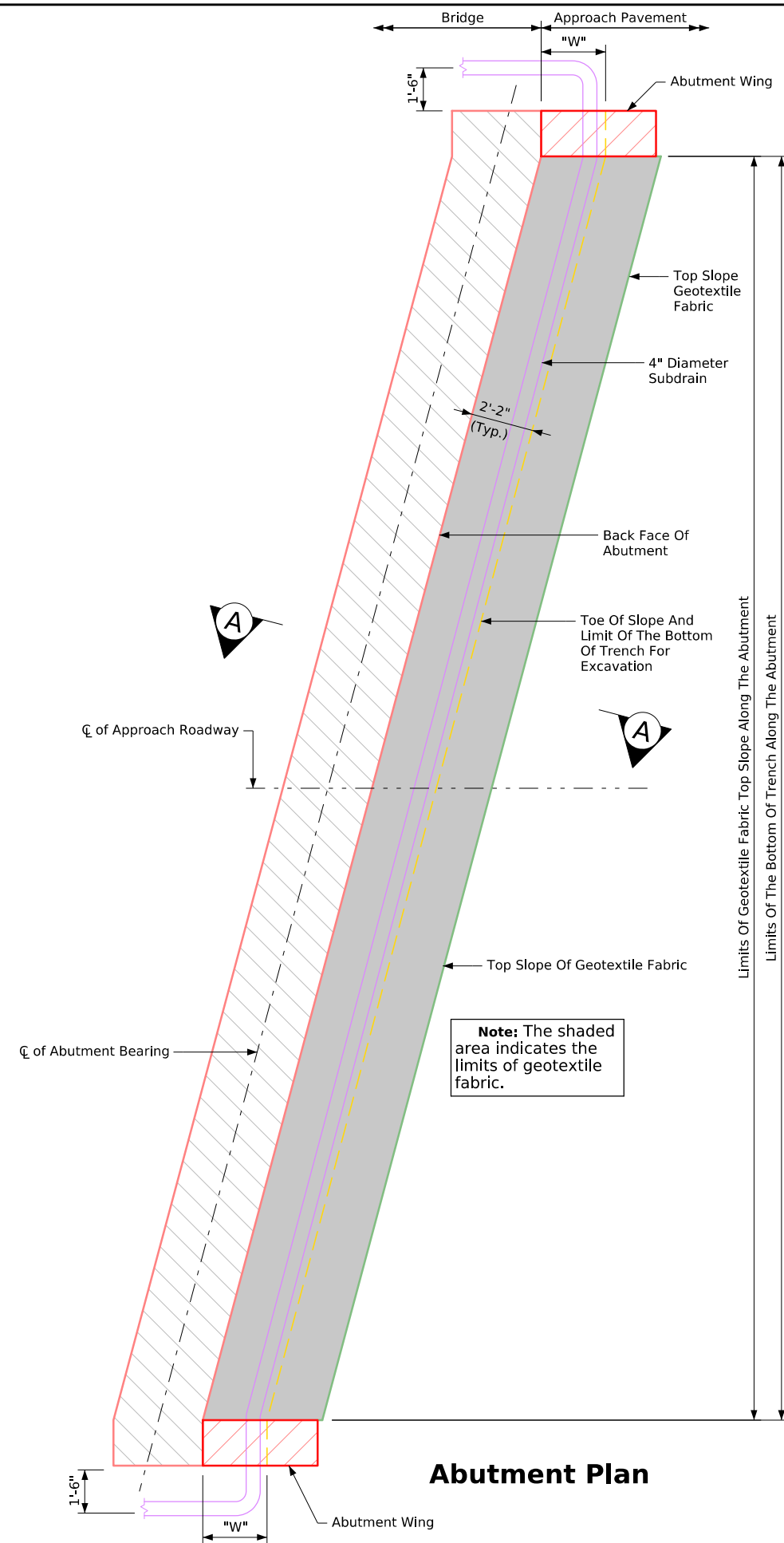
Water used for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric at the bridge abutments will not be measured separately for payment. The cost of this water shall be included in the contract unit price bid for **"Structural Concrete (Bridge)"**.

Note:

Subdrain shall slope downward 2% from centerline approach roadway when outletting both sides of the abutment.

Subdrain shall slope downward 2% from high end when outletting at one end of the abutment.

The geotextile fabric shall be in accordance with **Article 4196.01, B, 6 of the Standard Specifications**. If the engineering fabric is lapped the laps shall be a minimum of one foot in length, shingle fashion with up slope lap piece on top and stapled for continuity.




Backfill Details

Note: Geotextile fabric shall be attached to the face of the abutment footing and wings.

* Dimension varies due to the 2% subdrain slope.

"W" Dimension	
Skew	Dimension
15 Degree	2'-2 1/4"
30 Degree	2'-6"
45 Degree	3'-0 3/4"

Note: For additional details not shown on this sheet, see **Subdrain Details** on Sheet **J40-53-25**.

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