



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.

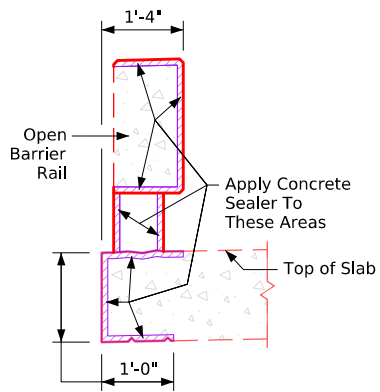
English Size	3	4	5	6	7	8	9	10	11
Bar Designation	10	13	16	19	22	25	29	32	36

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.

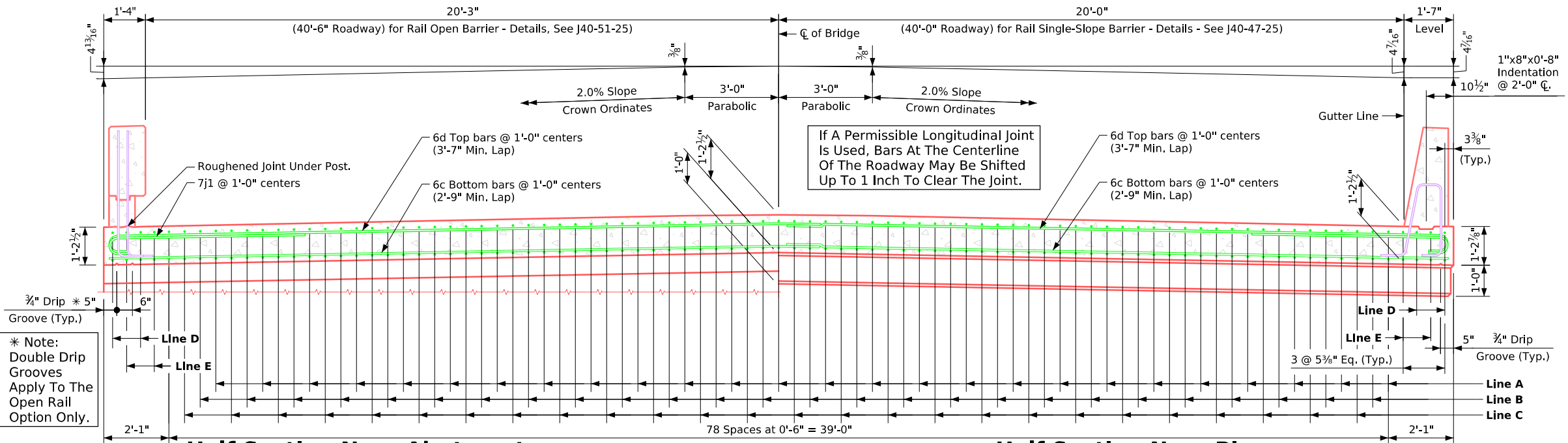


Concrete Sealer Application Limits - Open Rail Section

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.

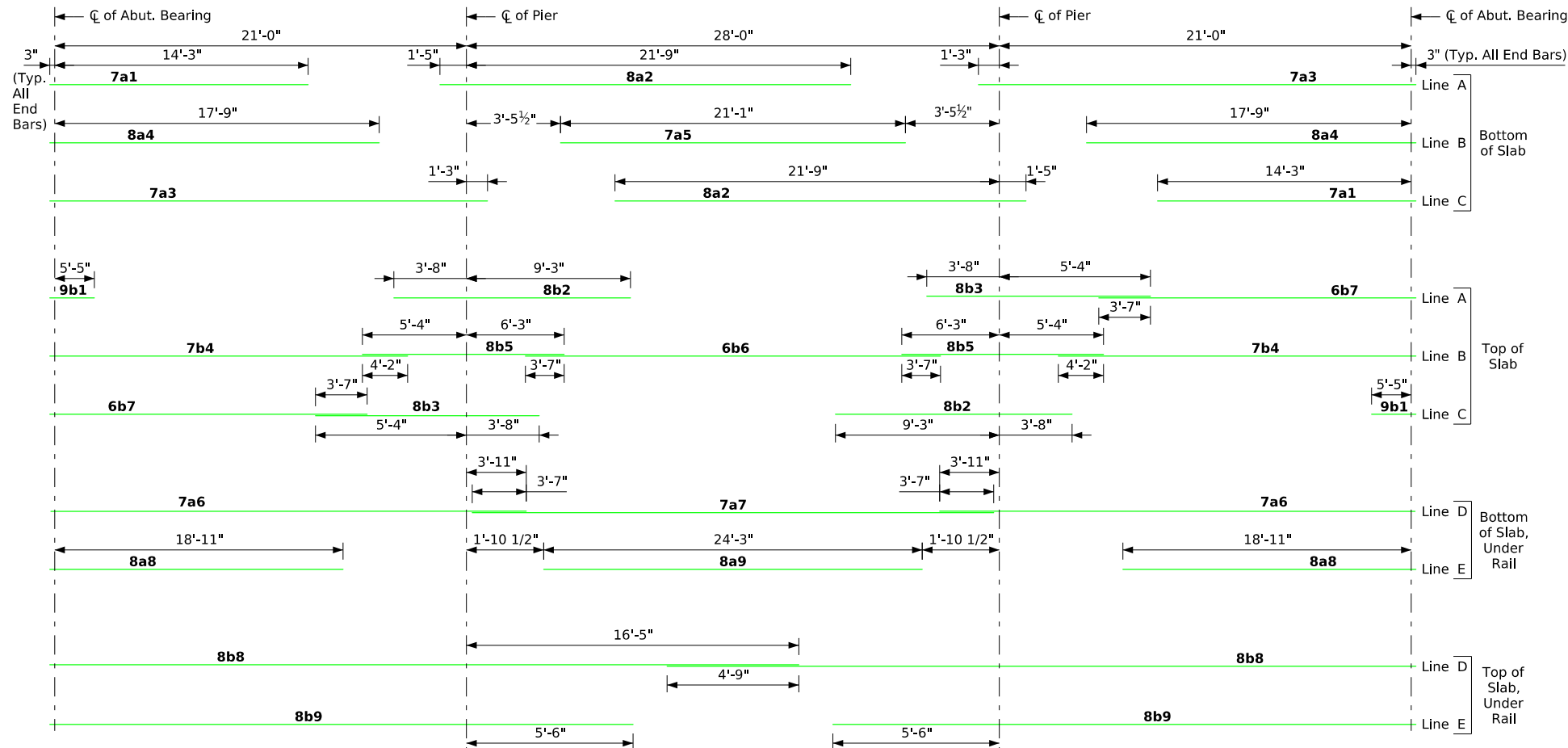
Note:

Top longitudinal reinforcing steel shall be parallel to and $2\frac{3}{4}$ 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.

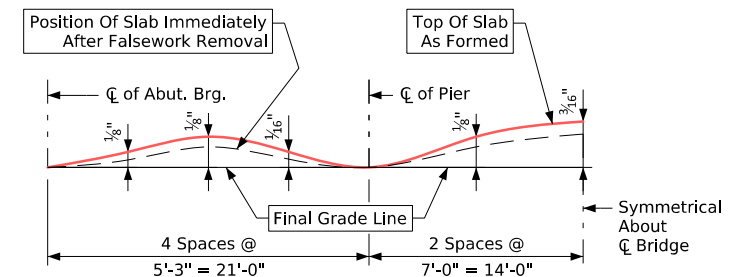
Half Section Near Pier

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

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



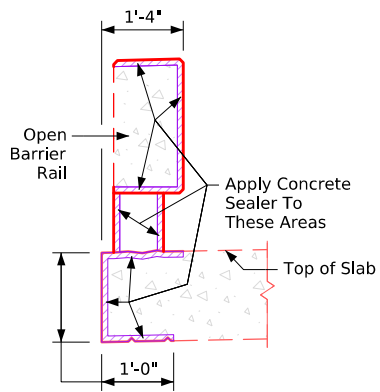
70' - Placement for Longitudinal Reinforcement



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

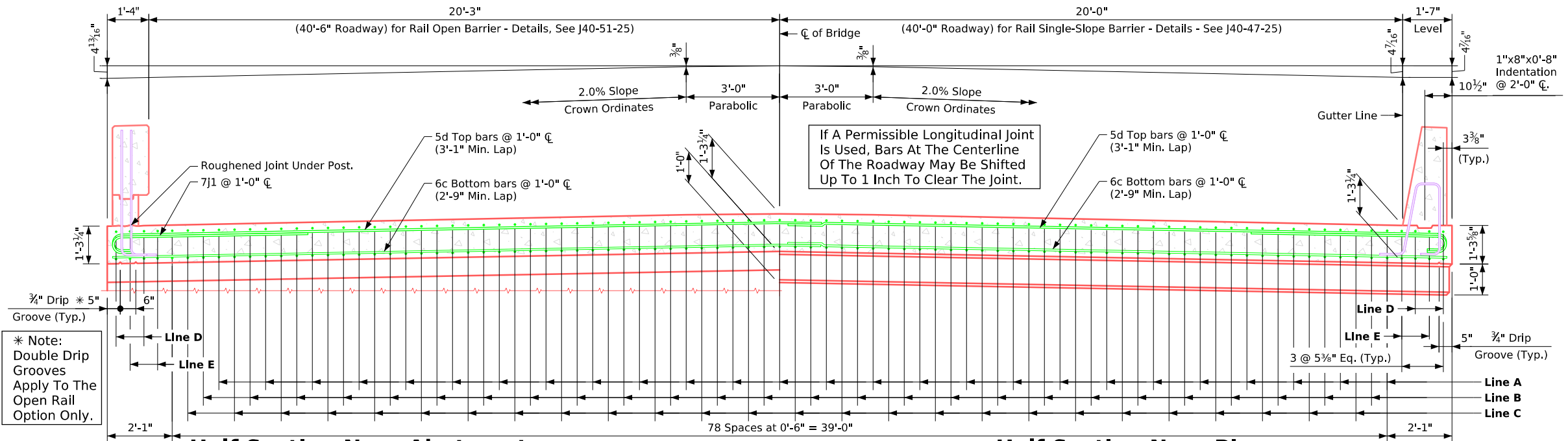


Concrete Sealer Application Limits - Open Rail Section

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 = 54.86 sq. ft.

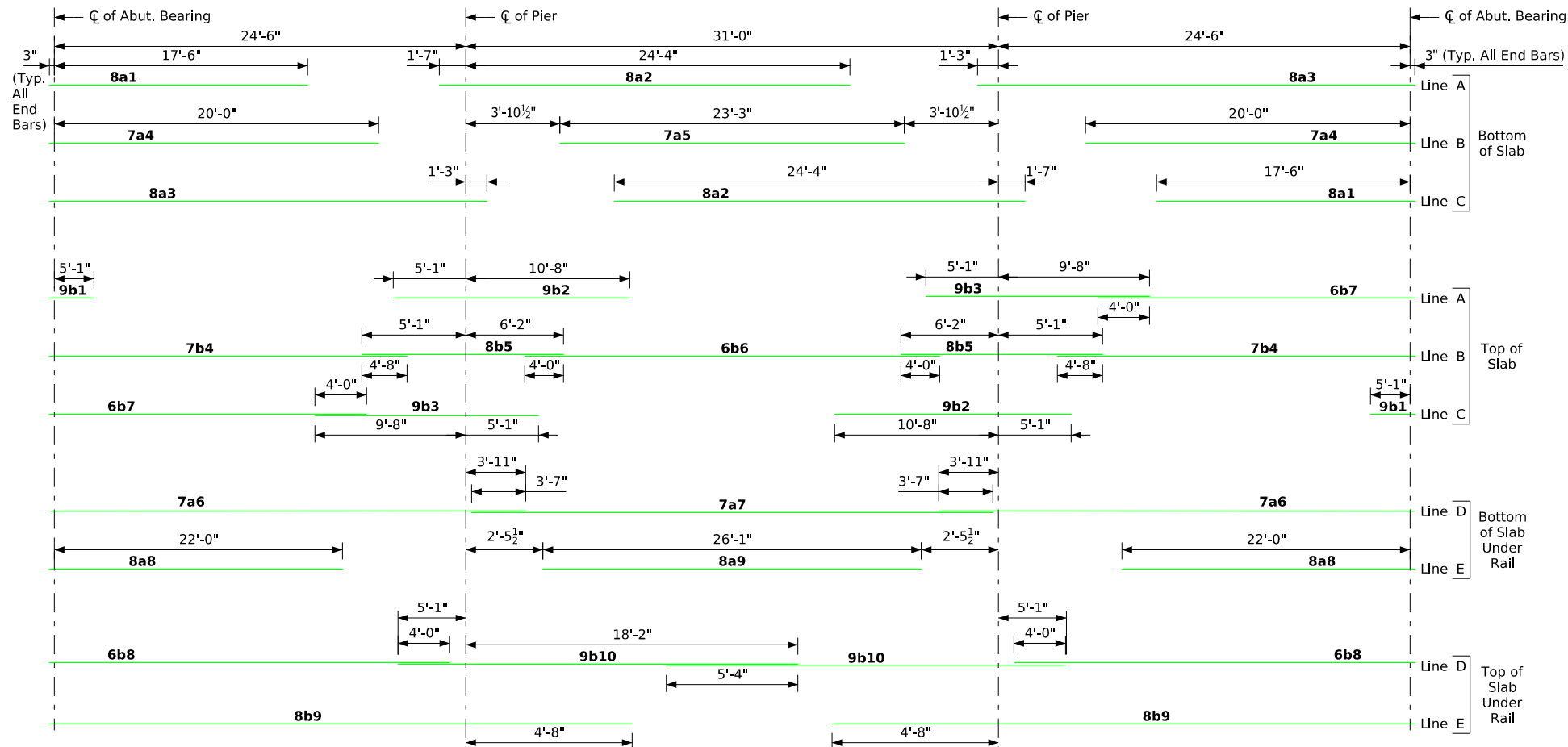
Note:

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.

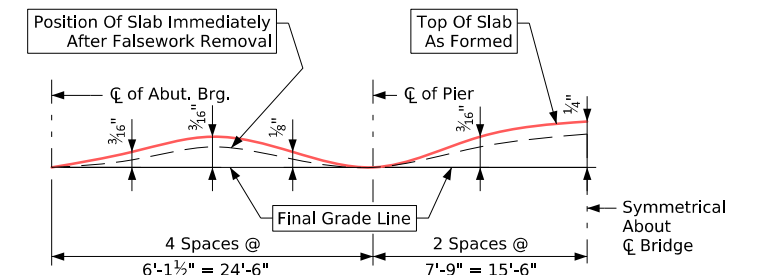
Half Section Near Pier

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

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




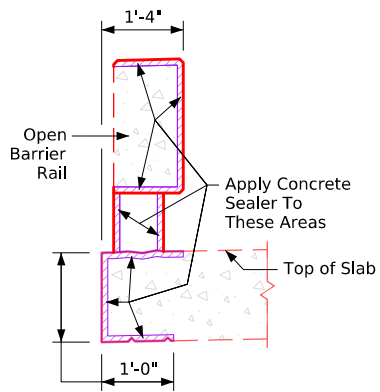
80' - Placement for Longitudinal Reinforcement



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



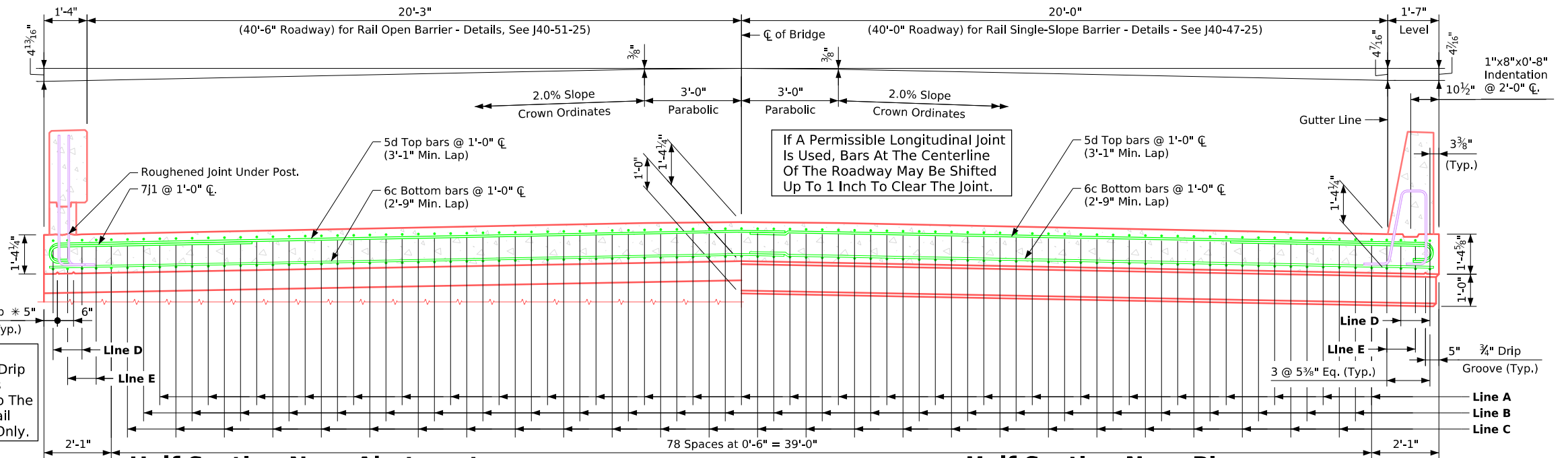
Concrete Sealer Application Limits - Open Rail Section

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.

3/4" Drip * 5" Groove (Typ.)



Half Section Near Abutment

Slab Cross-Section Area For Open Rail = 58.45 sq. ft.

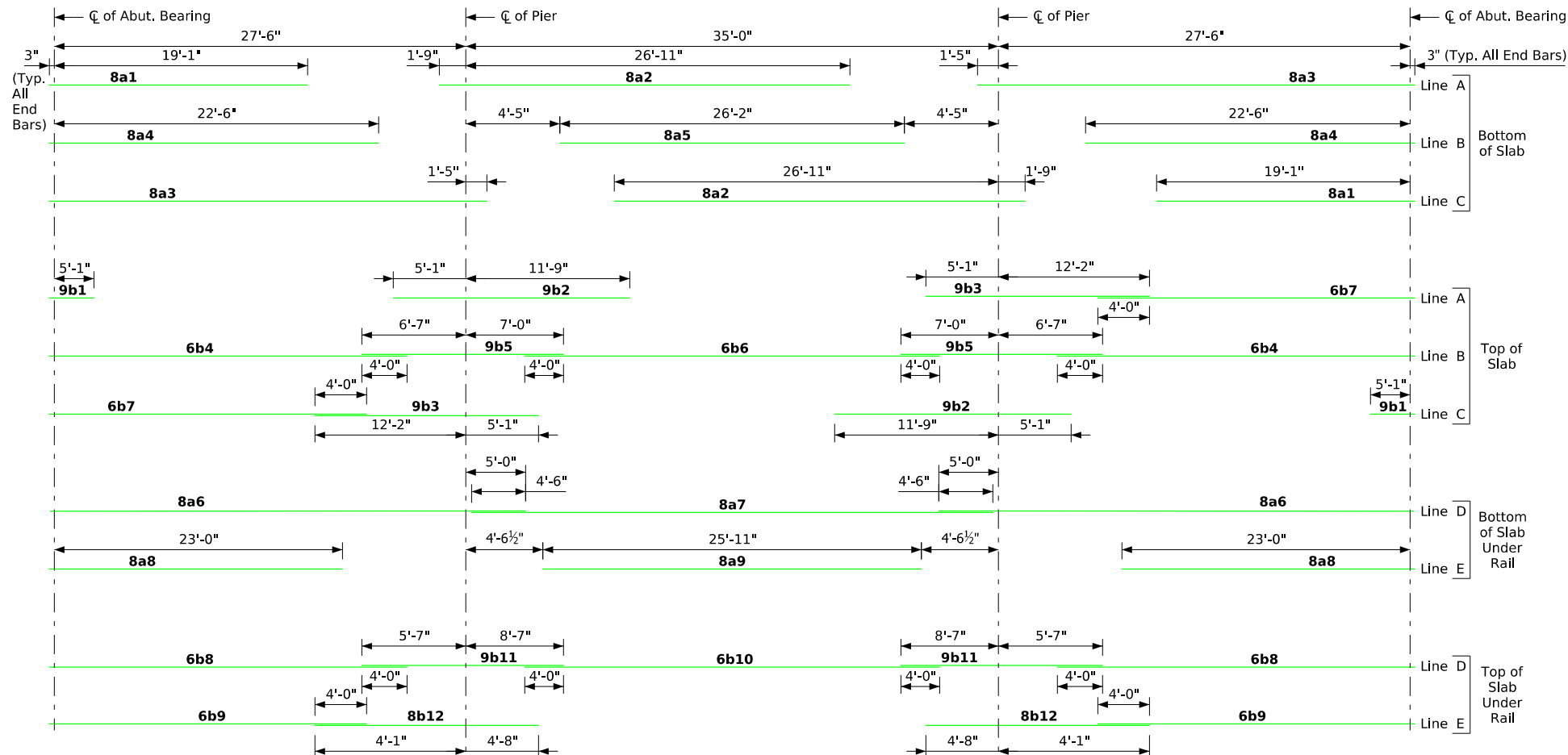
Note:

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.

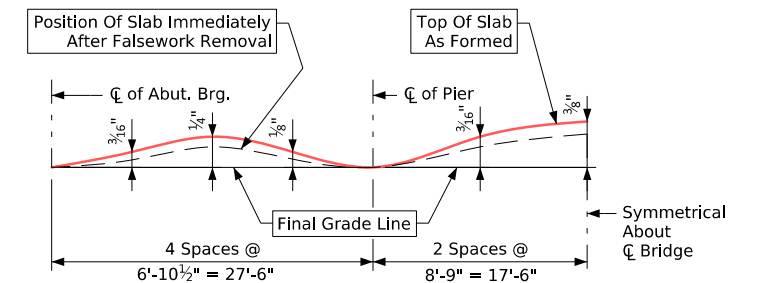
Half Section Near Pier

Slab Cross-Section Area For Single-Slope Barrier Rail = 58.50 sq. ft.

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




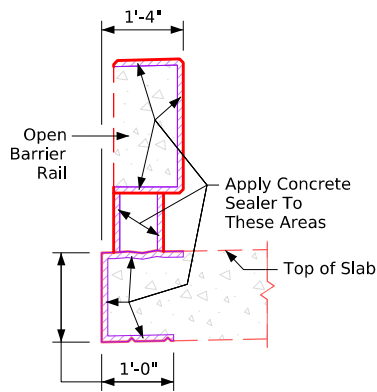
90' - Placement for Longitudinal Reinforcement



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		IOWA DOT	
		Standard Design-40'-0" Roadway, 3 Span Bridge	
		Continuous Concrete Slab Bridge	
		July, 2025	
		Superstructure Details 90'-0" Bridge	J40-06-25

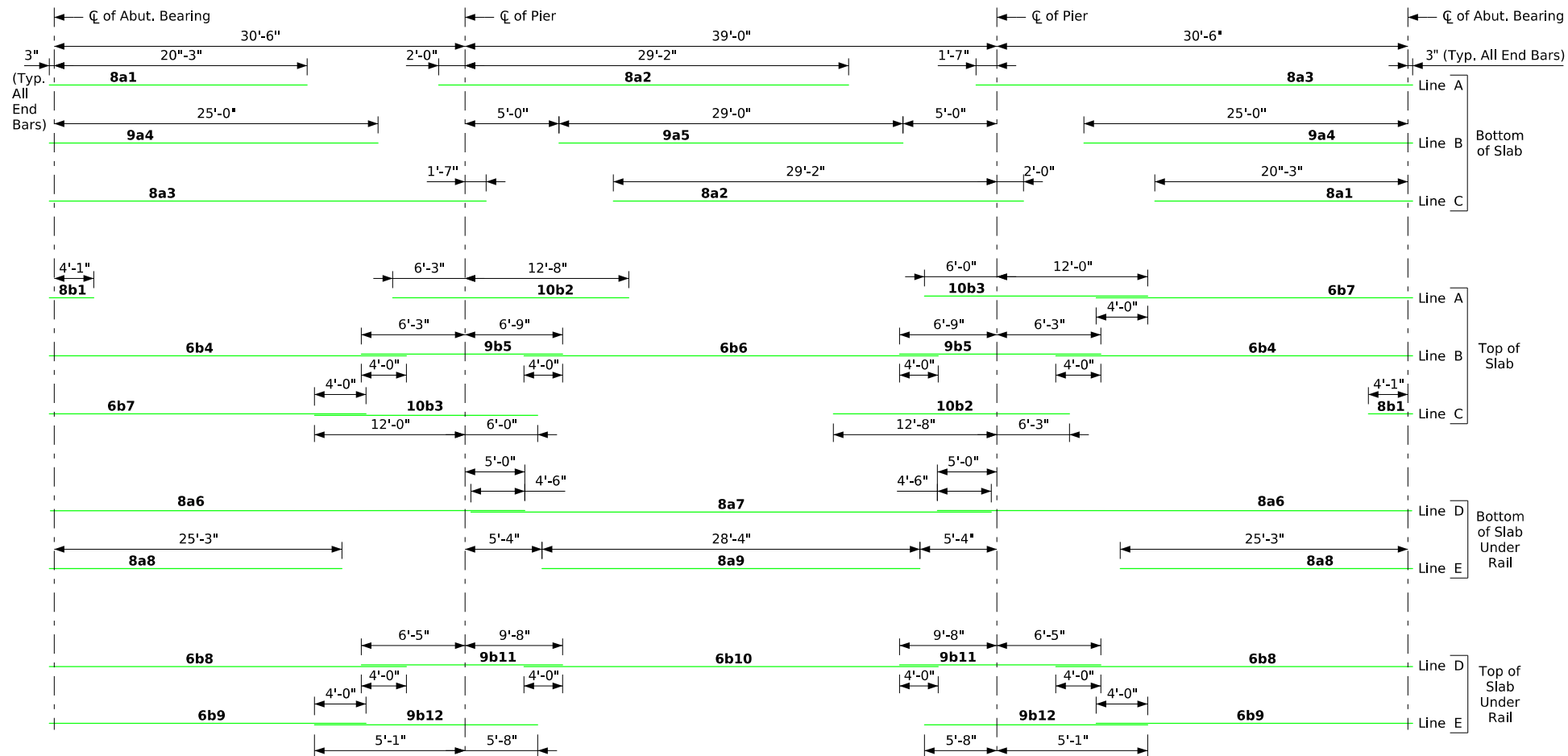
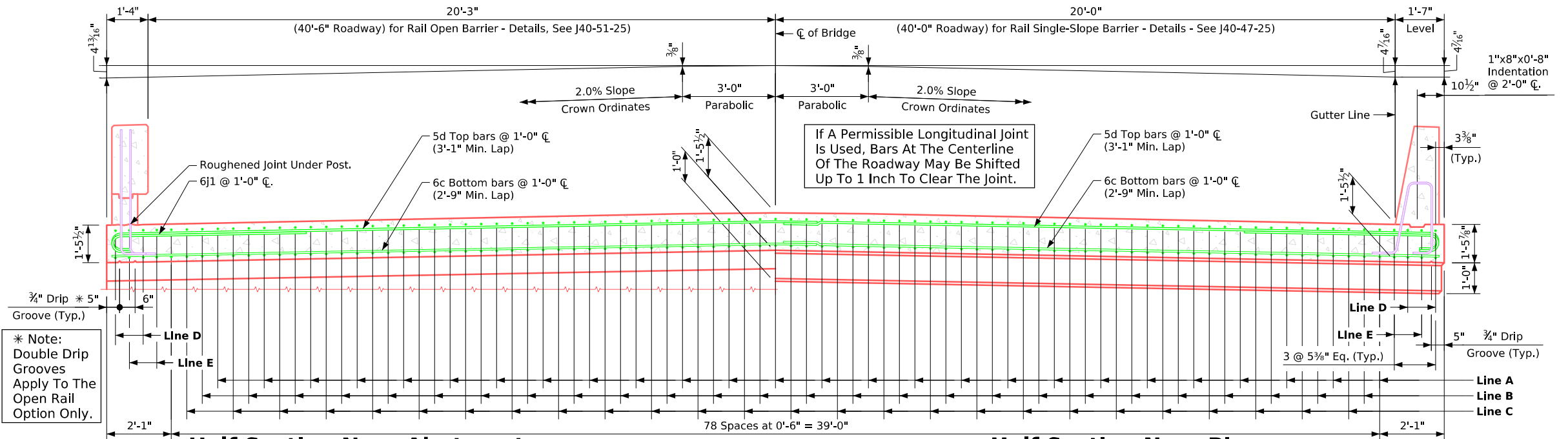


Concrete Sealer Application Limits - Open Rail Section

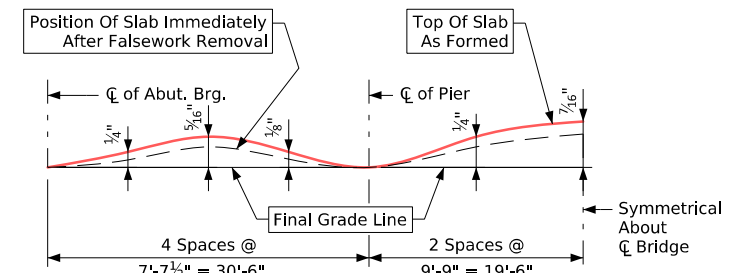
Apply concrete sealer to:

- 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.

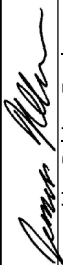


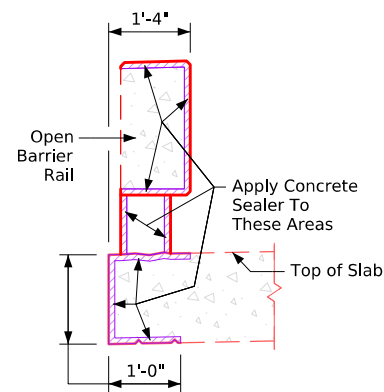
100' - Placement for Longitudinal Reinforcement



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	IOWA DOT	
		Standard Design-40'-0" Roadway, 3 Span Bridge	
		Continuous Concrete Slab Bridge	
		July, 2025	
		Superstructure Details 100'-0" Bridge	J40-08-25



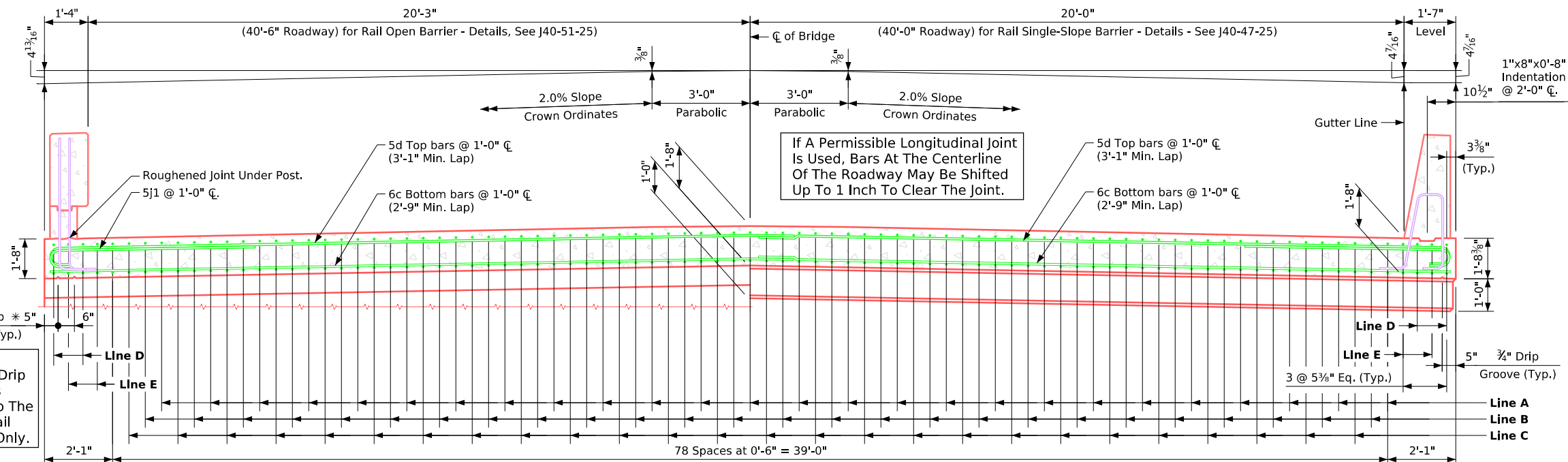
Concrete Sealer Application Limits - Open Rail Section

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.

3/4" Drip * 5" Groove (Typ.)



Half Section Near Abutment

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

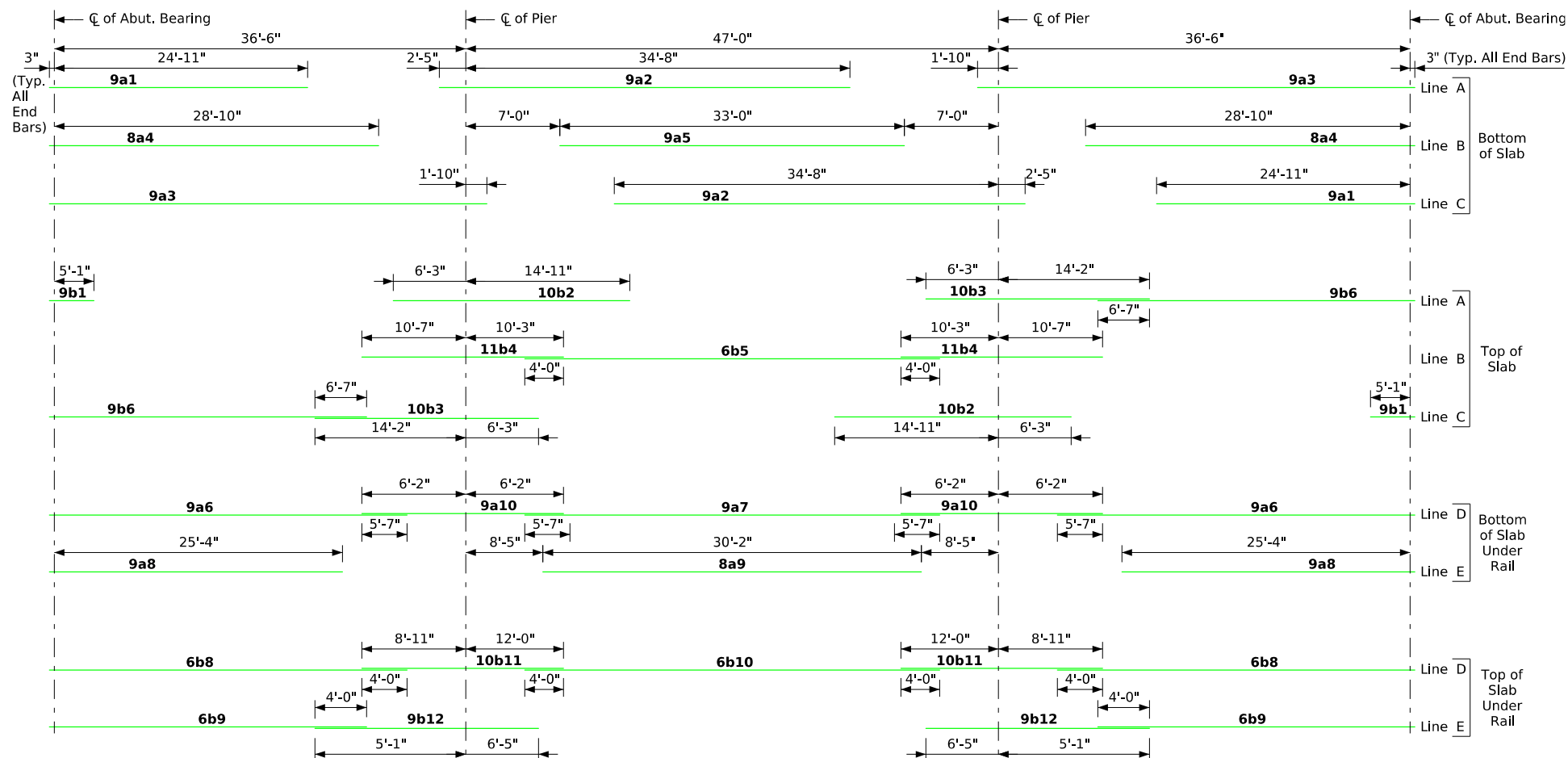
Note:

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.

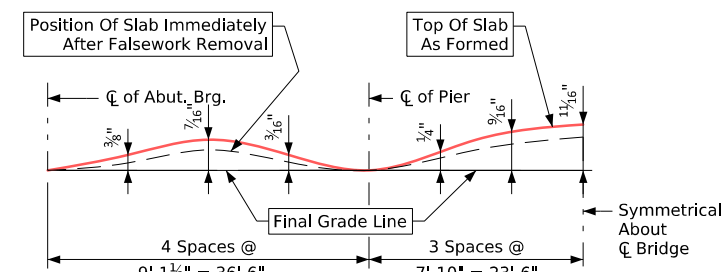
Half Section Near Pier

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.

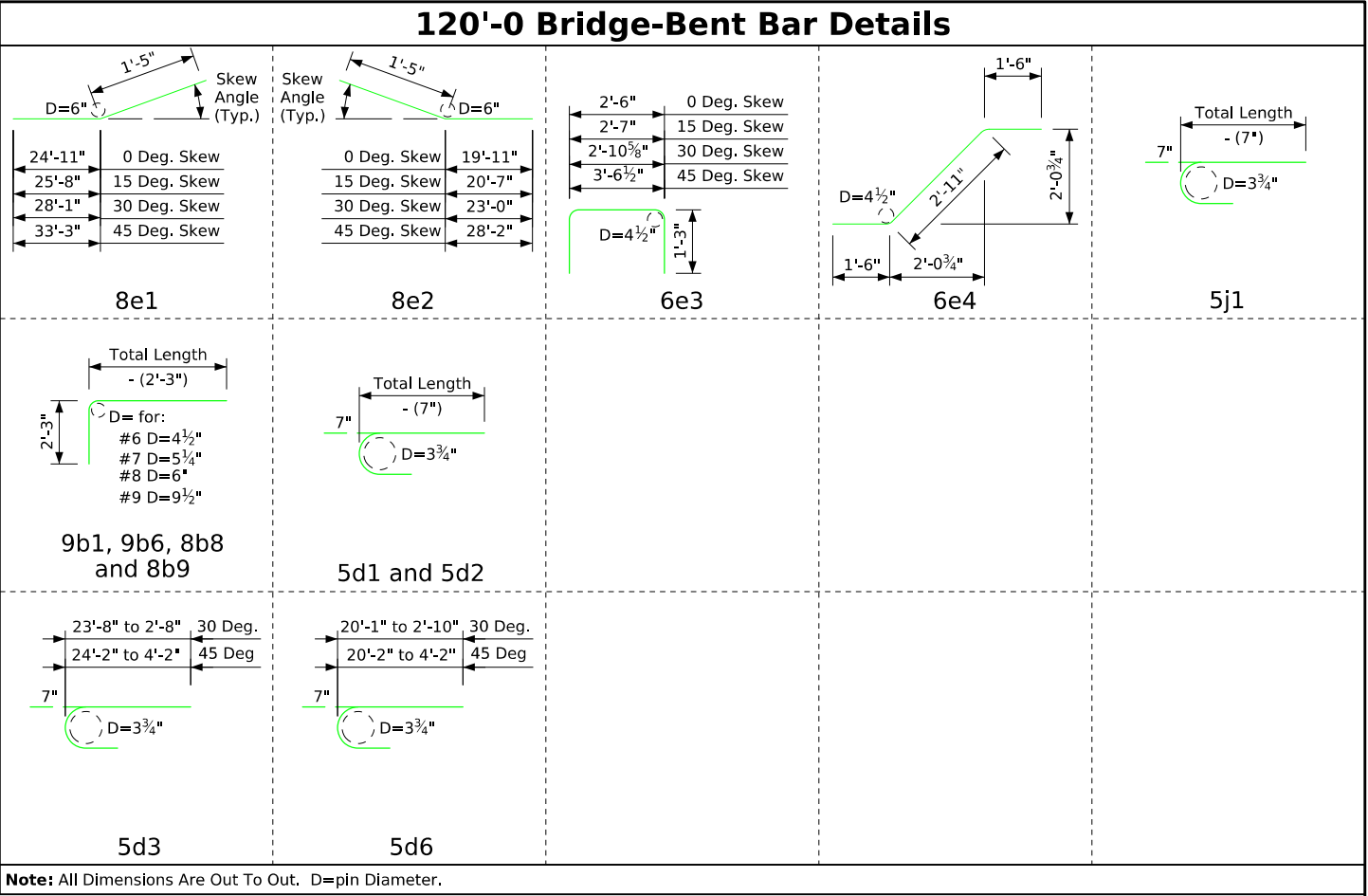
Latest Revision Date	 Approved by Bridge Engineer	IOWA DOT	
		Standard Design-40'-0" Roadway, 3 Span Bridge	
		Continuous Concrete Slab Bridge	
		July, 2025	
		Superstructure Details 120'-0" Bridge	J40-12-25

	Epoxy Steel Reinforcing for Superstructure-120' Bridge													
	Degree Skew		0				15				30			
Location	Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
Slab Longitudinal Bottom		9a1	53	25'-2"	4536	53	25'-2"	4536	53	25'-2"	4536	53	25'-2"	4536
Slab Longitudinal Bottom		9a2	53	37'-1"	6683	53	37'-1"	6683	53	37'-1"	6683	53	37'-1"	6683
Slab Longitudinal Bottom		9a3	53	38'-7"	6953	53	38'-7"	6953	53	38'-7"	6953	53	38'-7"	6953
Slab Longitudinal Bottom		8a4	52	29'-1"	4038	52	29'-1"	4038	52	29'-1"	4038	52	29'-1"	4038
Slab Longitudinal Bottom		9a5	26	33'-0"	2918	26	33'-0"	2918	26	33'-0"	2918	26	33'-0"	2918
Slab Longitudinal Bottom, at Rail		9a6	8	36'-2"	984	8	36'-2"	984	8	36'-2"	984	8	36'-2"	984
Slab Longitudinal Bottom, at Rail		9a7	4	45'-10"	624	4	45'-10"	624	4	45'-10"	624	4	45'-10"	624
Slab Longitudinal Bottom, at Rail		9a8	8	25'-7"	696	8	25'-7"	696	8	25'-7"	696	8	25'-7"	696
Slab Longitudinal Bottom, at Rail		8a9	4	30'-2"	323	4	30'-2"	323	4	30'-2"	323	4	30'-2"	323
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		9b1	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367	53	7'-7"	1367
Slab Longitudinal Top		10b2	53	21'-2"	4828	53	21'-2"	4828	53	21'-2"	4828	53	21'-2"	4828
Slab Longitudinal Top		10b3	53	20'-5"	4657	53	20'-5"	4657	53	20'-5"	4657	53	20'-5"	4657
Slab Longitudinal Top		11b4	52	20'-10"	5756	52	20'-10"	5756	52	20'-10"	5756	52	20'-10"	5756
Slab Longitudinal Top		6b5	26	34'-6"	1348	26	34'-6"	1348	26	34'-6"	1348	26	34'-6"	1348
Slab Longitudinal Top		9b6	53	31'-5"	5662	53	31'-5"	5662	53	31'-5"	5662	53	31'-5"	5662
Slab Longitudinal Top, at Rail		6b8	8	34'-1"	410	8	34'-1"	410	8	34'-1"	410	8	34'-1"	410
Slab Longitudinal Top, at Rail		6b9	8	37'-11"	456	8	37'-11"	456	8	37'-11"	456	8	37'-11"	456
Slab Longitudinal Top, at Rail		6b10	4	31'-0"	187	4	31'-0"	187	4	31'-0"	187	4	31'-0"	187
Slab Longitudinal Top, at Rail		10b11	8	20'-11"	721	8	20'-11"	721	8	20'-11"	721	8	20'-11"	721
Slab Longitudinal Top, at Rail		9b12	8	11'-6"	313	8	11'-6"	313	8	11'-6"	313	8	11'-6"	313
Slab Transverse Bottom		6c1	117	24'-4"	4277	117	25'-2"	4423	107	24'-4"	3911	97	24'-4"	3546
Slab Transverse Bottom		6c2	117	21'-3"	3735	117	22'-0"	3867	109	21'-3"	3480	101	21'-3"	3224
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	13	VARIES	262	21	VARIES	447
Slab Transverse Ends, Bottom		6c4	-	-	-	-	-	-	11	VARIES	233	20	VARIES	386
Slab Transverse Ends, Bottom		6c5	-	-	-	-	-	-	10	VARIES	173	17	VARIES	298
Slab Transverse Ends, Bottom		6c6	-	-	-	-	-	-	11	VARIES	191	17	VARIES	311
Slab Transverse Top		5d1	117	25'-3"	3082	117	26'-1"	3183	107	25'-3"	2818	97	25'-3"	2555
Slab Transverse Top		5d2	117	21'-10"	2665	117	22'-7"	2756	109	21'-10"	2483	101	21'-10"	2300
Slab Transverse Ends, Top		5d3	-	-	-	-	-	-	13	VARIES	188	21	VARIES	324
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	11	VARIES	166	20	VARIES	275
Slab Transverse Ends, Top		5d5	-	-	-	-	-	-	10	VARIES	120	17	VARIES	207
Slab Transverse Ends, Top		5d6	-	-	-	-	-	-	11	VARIES	139	17	VARIES	227
Slab, Tansverse at Abutment		8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667
Slab, Tansverse at Abutment		8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422
Slab, Tansverse at Abutment		6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841
Slab, Tansverse 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	232	6'-9"	1634	232	6'-9"	1634	222	6'-9"	1563	216	6'-9"	1521
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)					73,509			74,059			74,201			74,684
Rail Single-Slope Barrier – Quantities - See Sheet J40-48-25.					5108			5108			5108			5108
Rail Open Barrier – Quantities - See Sheet J40-52-25.					5967			5967			5967			5967
Epoxy Coated Rail Total-Ibs. Monolithic Single-Slope Rail					78,617			79,167			79,309			79,792
Epoxy Coated Rail Total-Ibs. Monolithic Open Rail					79,476			80,026			80,168			80,651
Epoxy Coated Rail Total-Ibs. Non-Monolithic Single-Slope Rail					78,617			79,167			79,309			79,792
Epoxy Coated Rail Total-Ibs. Non-Monolithic Open Rail					79,476			80,026			80,168			80,651
Stainless Steel Rail Total-Ibs. Single-Slope Rail					2640			2640			2640			2640
Stainless Steel Rail Total-Ibs. Open Rail					2371			2371			2371			2371

Estimated Quantities for Superstructure 120' Bridge									
Item	Monolithic Cap				Non-Monolithic Cap				
	0°	15°	30°	45°	0°	15°	30°	45°	
With Single-Slope Rail									
* Structural Concrete (Bridge) (c.y.)	342.8	343.6	345.6	350.5	346.2	346.9	349.5	355.1	
Reinf. Steel Epoxy Coated (lbs.)	78,617	79,167	79,309	79,792	78,617	79,167	79,309	79,792	
Δ Reinf. Steel Stainless Steel (lbs.)	2863	2863	2863	2863	2863	2863	2863	2863	
Concrete single-slope barrier or open rail (lin.ft.)	262	262.2	262.9	264.5	262	262.2	262.9	264.5	
With Open Rail									
* Structural Concrete (Bridge) (c.y.)	342.6	343.3	345.4	350.4	346	346.7	349.3	354.9	
Reinf. Steel Epoxy Coated (lbs.)	79,476	80,026	80,168	80,651	79,476	80,026	80,168	80,651	
Δ Reinf. Steel Stainless Steel (lbs.)	2594	2594	2594	2594	2594	2594	2594	2594	

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

Δ Includes abutment paving notch bar weight.



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

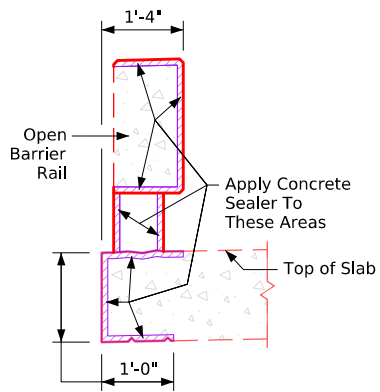
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

Superstructure Details
120'-0" Bridge Quantities

J40-13-25

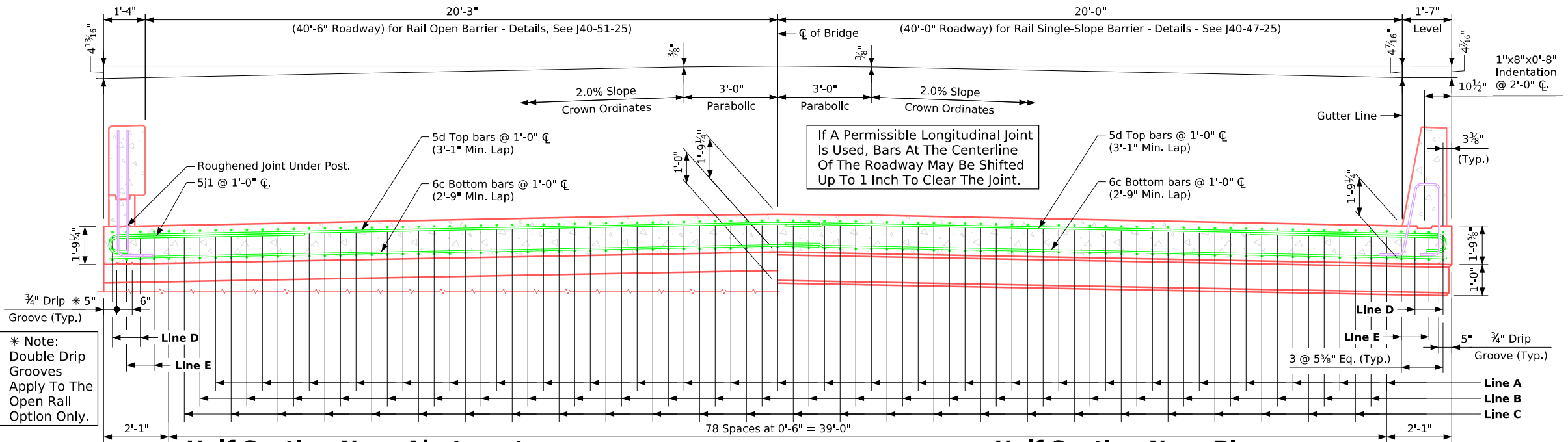


Concrete Sealer Application Limits - Open Rail Section

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 = 76.44 sq. ft.

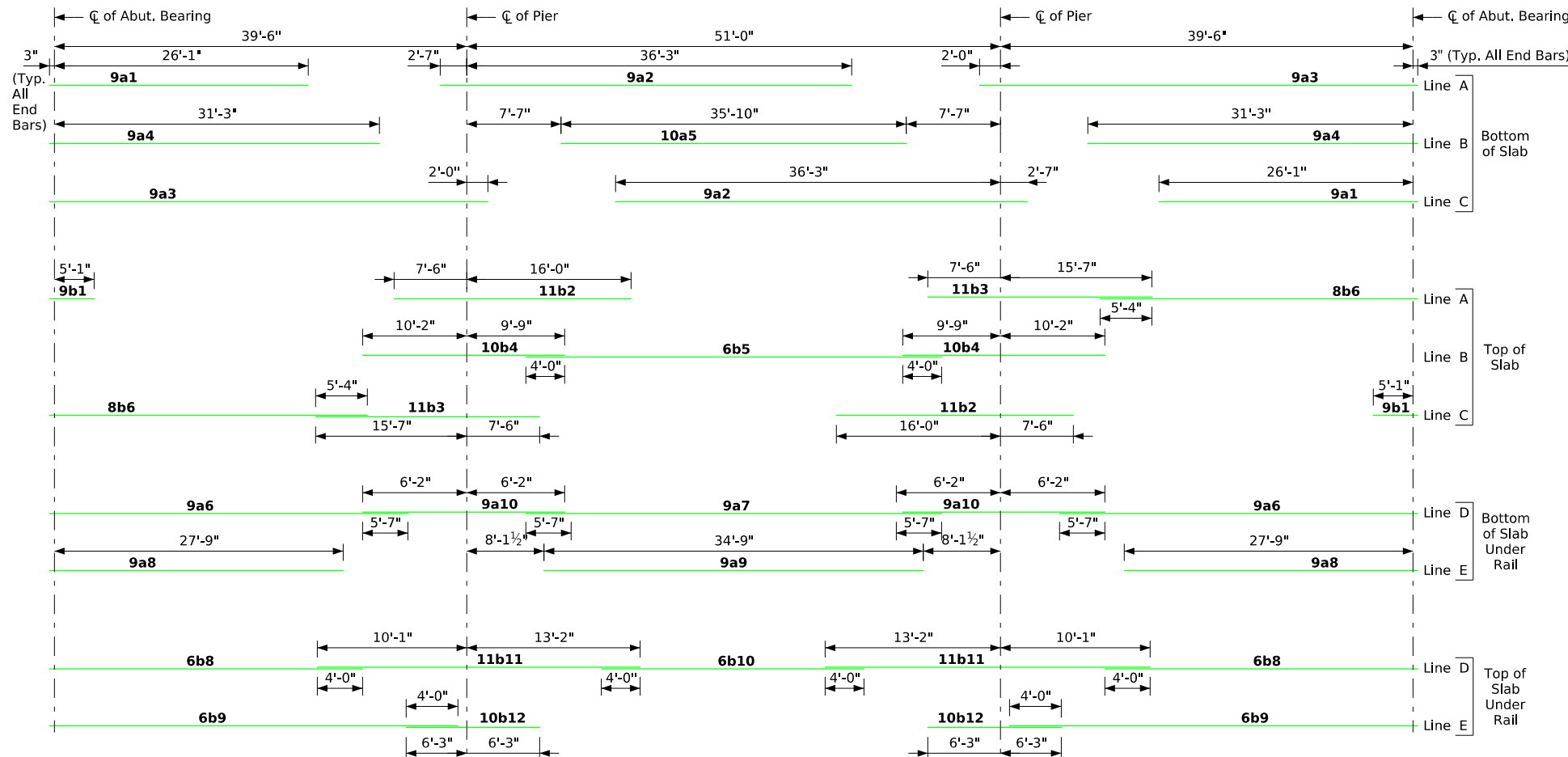
Note:

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.

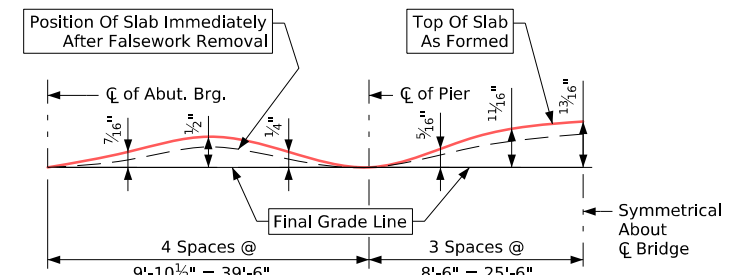
Half Section Near Pier

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

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



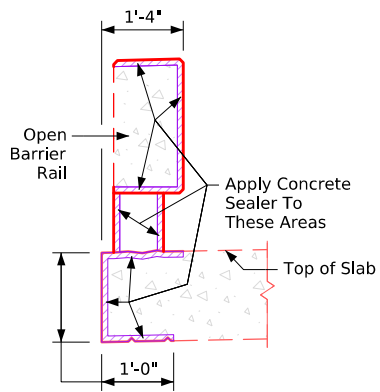
130' - Placement for Longitudinal Reinforcement



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



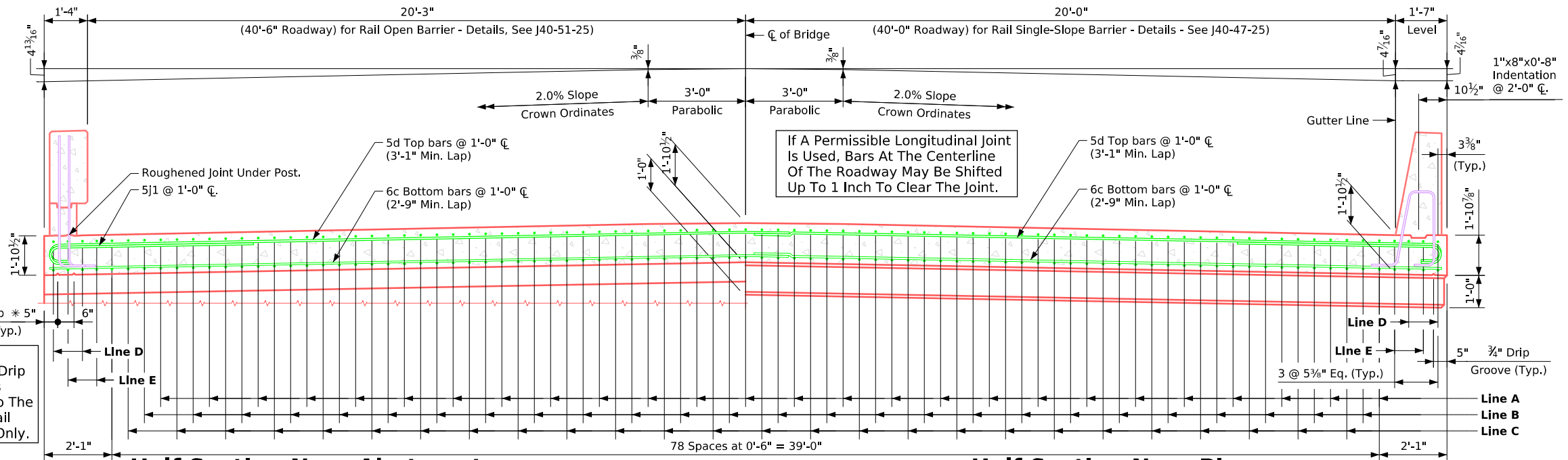
Concrete Sealer Application Limits - Open Rail Section

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.

3/4" Drip * 5"
Groove (Typ.)



Half Section Near Abutment

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

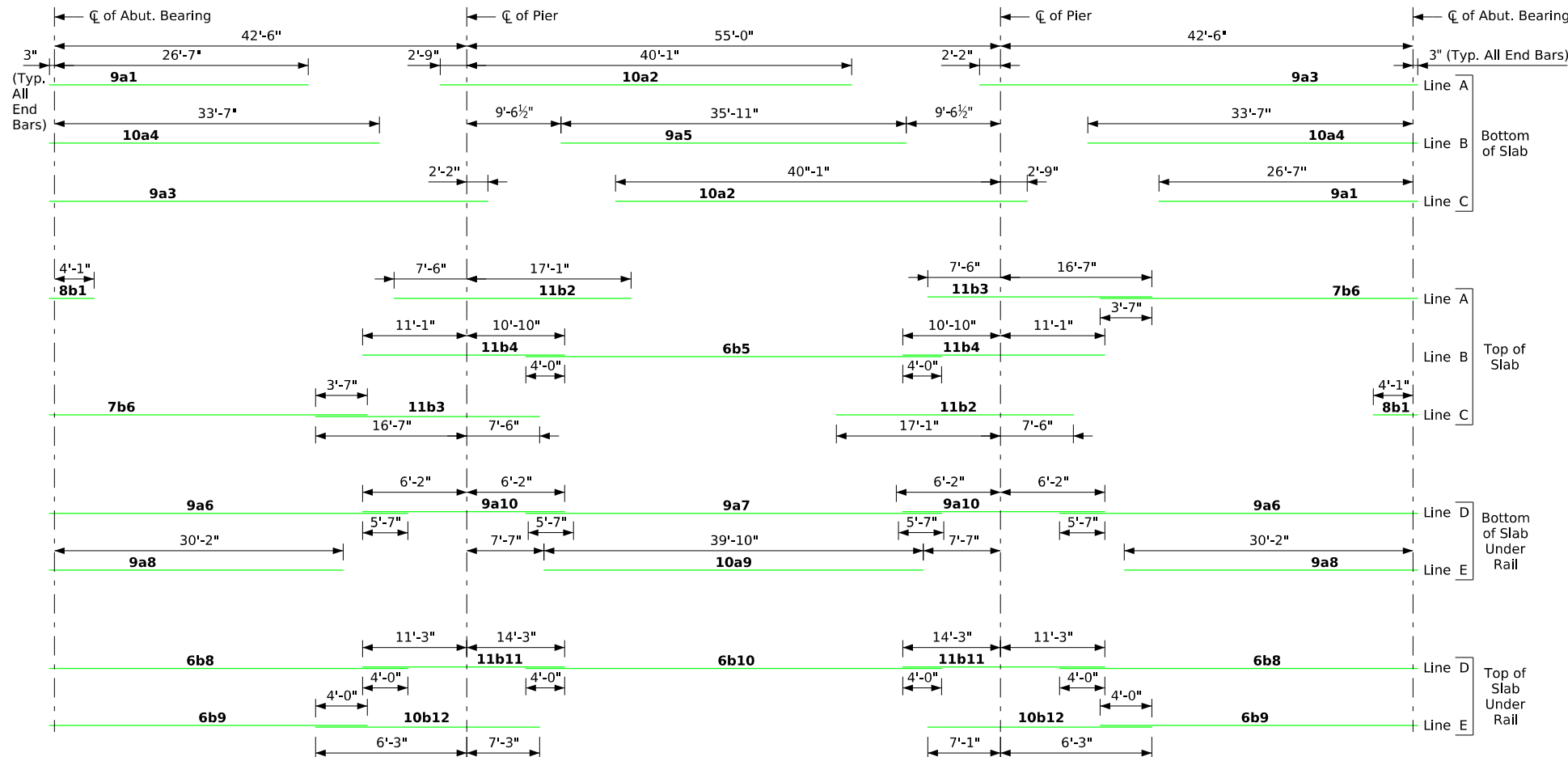
Note:

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.

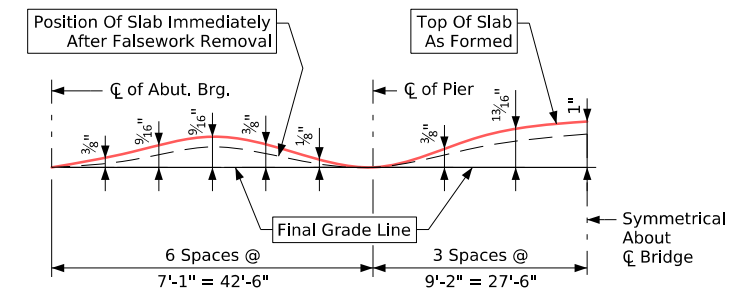
Half Section Near Pier

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

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












































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

		Epoxy Steel Reinforcing for Superstructure-140' Bridge														
		Degree Skew		0				15			30			45		
Location		Shape	Bar	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	
Slab Longitudinal Bottom			9a1	53	26'-10"	4836	53	26'-10"	4836	53	26'-10"	4836	53	26'-10"	4836	
Slab Longitudinal Bottom			10a2	53	42'-10"	9769	53	42'-10"	9769	53	42'-10"	9769	53	42'-10"	9769	
Slab Longitudinal Bottom			9a3	53	44'-11"	8094	53	44'-11"	8094	53	44'-11"	8094	53	44'-11"	8094	
Slab Longitudinal Bottom			10a4	52	33'-10"	7571	52	33'-10"	7571	52	33'-10"	7571	52	33'-10"	7571	
Slab Longitudinal Bottom			9a5	26	35'-11"	3176	26	35'-11"	3176	26	35'-11"	3176	26	35'-11"	3176	
Slab Longitudinal Bottom, at Rail			9a6	8	42'-2"	1147	8	42'-2"	1147	8	42'-2"	1147	8	42'-2"	1147	
Slab Longitudinal Bottom, at Rail			9a7	4	53'-10"	733	4	53'-10"	733	4	53'-10"	733	4	53'-10"	733	
Slab Longitudinal Bottom, at Rail			9a8	8	30'-5"	828	8	30'-5"	828	8	30'-5"	828	8	30'-5"	828	
Slab Longitudinal Bottom, at Rail			10a9	4	39'-10"	686	4	39'-10"	686	4	39'-10"	686	4	39'-10"	686	
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	24'-7"	6923	53	24'-7"	6923	53	24'-7"	6923	53	24'-7"	6923	
Slab Longitudinal Top			11b3	53	24'-1"	6782	53	24'-1"	6782	53	24'-1"	6782	53	24'-1"	6782	
Slab Longitudinal Top			11b4	52	21'-11"	6056	52	21'-11"	6056	52	21'-11"	6056	52	21'-11"	6056	
Slab Longitudinal Top			6b5	26	41'-4"	1615	26	41'-4"	1615	26	41'-4"	1615	26	41'-4"	1615	
Slab Longitudinal Top			8b6	53	33'-9"	4776	53	33'-9"	4776	53	33'-9"	4776	53	33'-9"	4776	
Slab Longitudinal Top, at Rail			6b8	8	37'-9"	454	8	37'-9"	454	8	37'-9"	454	8	37'-9"	454	
Slab Longitudinal Top, at Rail			6b9	8	42'-9"	514	8	42'-9"	514	8	42'-9"	514	8	42'-9"	514	
Slab Longitudinal Top, at Rail			6b10	4	34'-6"	208	4	34'-6"	208	4	34'-6"	208	4	34'-6"	208	
Slab Longitudinal Top, at Rail			11b11	8	25'-6"	1084	8	25'-6"	1084	8	25'-6"	1084	8	25'-6"	1084	
Slab Longitudinal Top, at Rail			10b12	8	13'-6"	465	8	13'-6"	465	8	13'-6"	465	8	13'-6"	465	
Slab Transverse Bottom			6c1	137	24'-4"	5008	137	25'-2"	5179	127	24'-4"	4642	117	24'-4"	4277	
Slab Transverse Bottom			6c2	137	21'-3"	4373	137	22'-0"	4528	129	21'-3"	4118	121	21'-3"	3863	
Slab Transverse Ends, Bottom			6c3	-	-	-	-	-	-	13	VARIES	262	21	VARIES	447	
Slab Transverse Ends, Bottom			6c4	-	-	-	-	-	-	11	VARIES	233	20	VARIES	386	
Slab Transverse Ends, Bottom			6c5	-	-	-	-	-	-	10	VARIES	173	17	VARIES	298	
Slab Transverse Ends, Bottom			6c6	-	-	-	-	-	-	11	VARIES	191	17	VARIES	311	
Slab Transverse Top			5d1	137	25'-3"	3608	137	26'-1"	3728	127	25'-3"	3345	117	25'-3"	3082	
Slab Transverse Top			5d2	137	21'-10"	3120	137	22'-7"	3227	129	21'-10"	2938	121	21'-10"	2756	
Slab Transverse Ends, Top			5d3	-	-	-	-	-	-	13	VARIES	188	21	VARIES	324	
Slab Transverse Ends, Top			5d4	-	-	-	-	-	-	11	VARIES	166	20	VARIES	275	
Slab Transverse Ends, Top			5d5	-	-	-	-	-	-	10	VARIES	120	17	VARIES	207	
Slab Transverse Ends, Top			5d6	-	-	-	-	-	-	11	VARIES	139	17	VARIES	227	
Slab, Tansverse at Abutment			8e1	18	26'-4"	1266	18	27'-1"	1302	18	29'-6"	1418	18	34'-8"	1667	
Slab, Tansverse at Abutment			8e2	18	21'-4"	1026	18	22'-0"	1058	18	24'-5"	1174	18	29'-7"	1422	
Slab, Tansverse at Abutment			6e3	92	5'-0"	691	92	5'-1"	703	92	5'-5"	749	92	6'-1"	841	
Slab, Tansverse 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	272	6'-9"	1915	272	6'-9"	1915	262	6'-9"	1845	256	6'-9"	1803	
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	

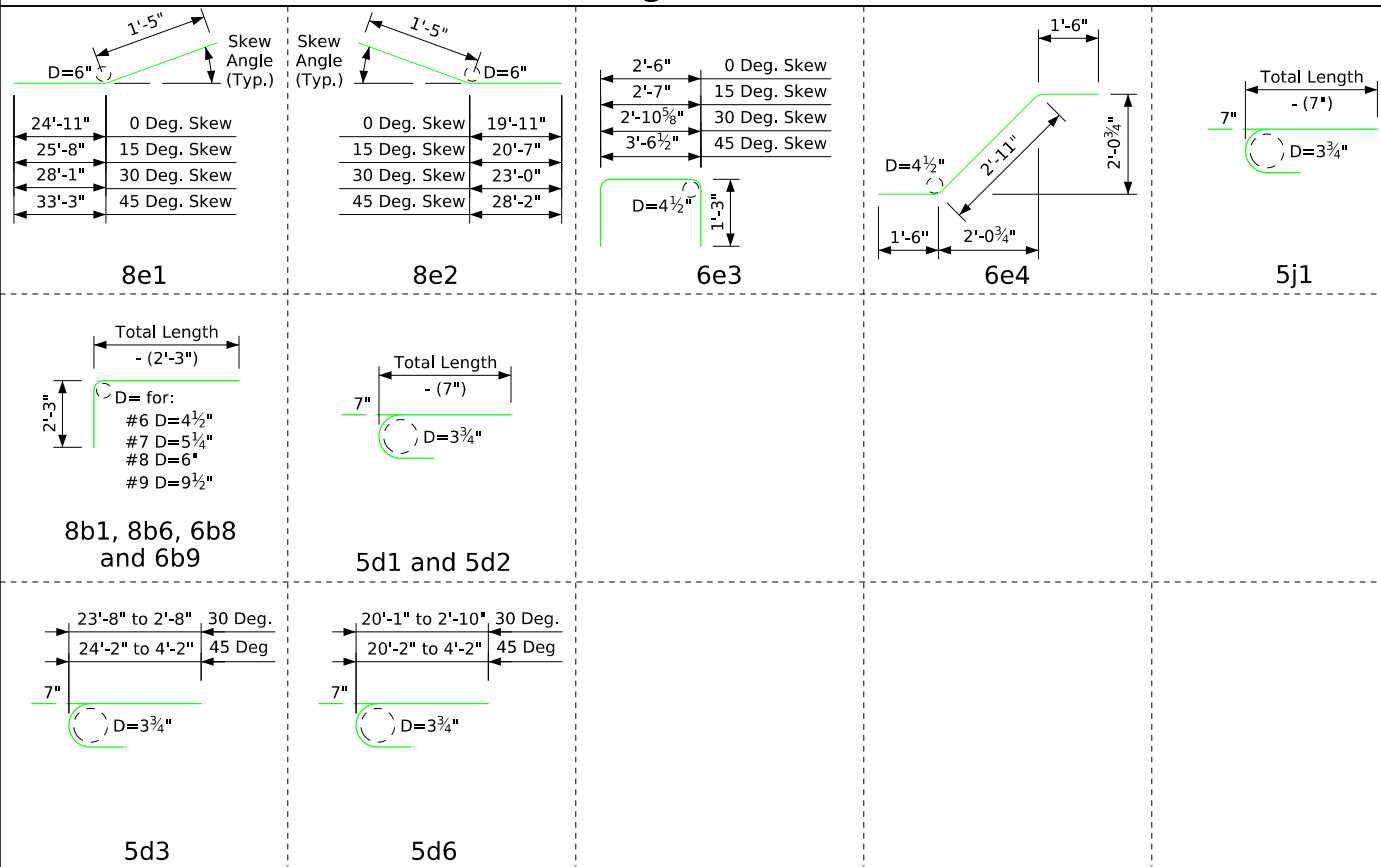
Estimated Quantities for Superstructure 140' Bridge

[illegible]

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

Δ Includes abutment paving notch bar weight.

140'-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

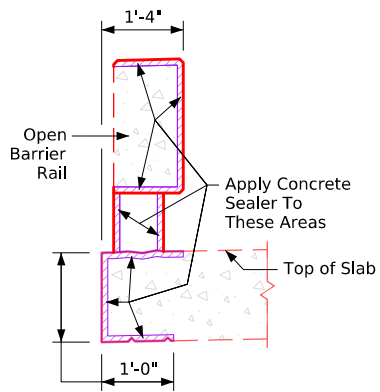
8u1 bars are to be paid for under the price bid for **"Reinforcing Steel, Stainless Steel"**

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	<h1>IOWA DOT</h1>	
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2>Continuous Concrete Slab Bridge</h2>	
	July, 2025 Superstructure Details 140'-0" Bridge Quantities	<h2>J40-17-25</h2>

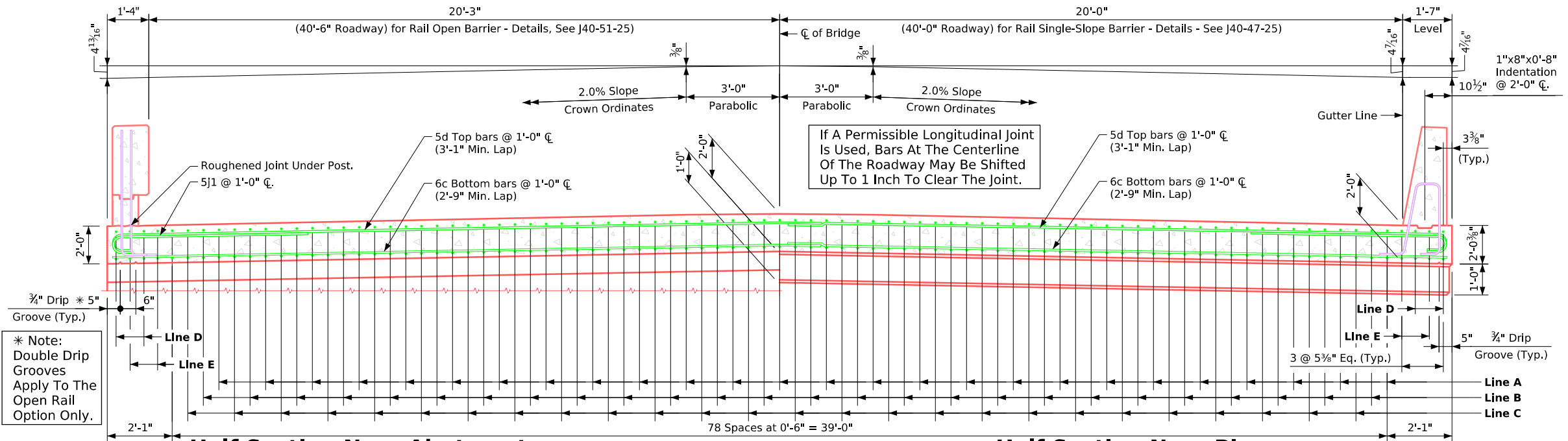


Concrete Sealer Application Limits - Open Rail Section

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.

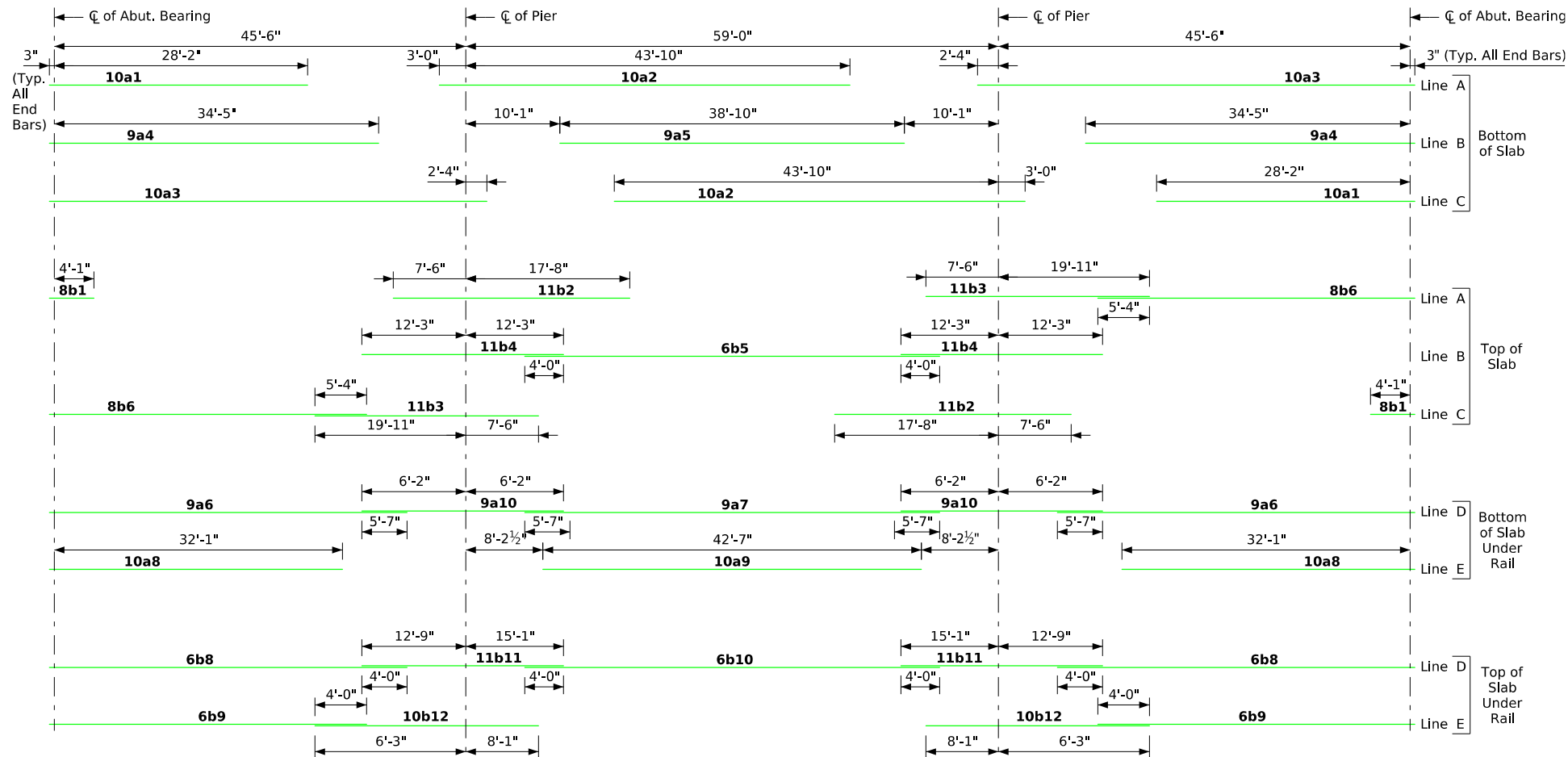
Note:

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.

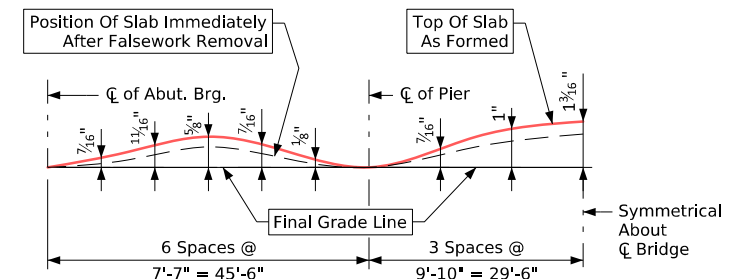
Half Section Near Pier

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

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




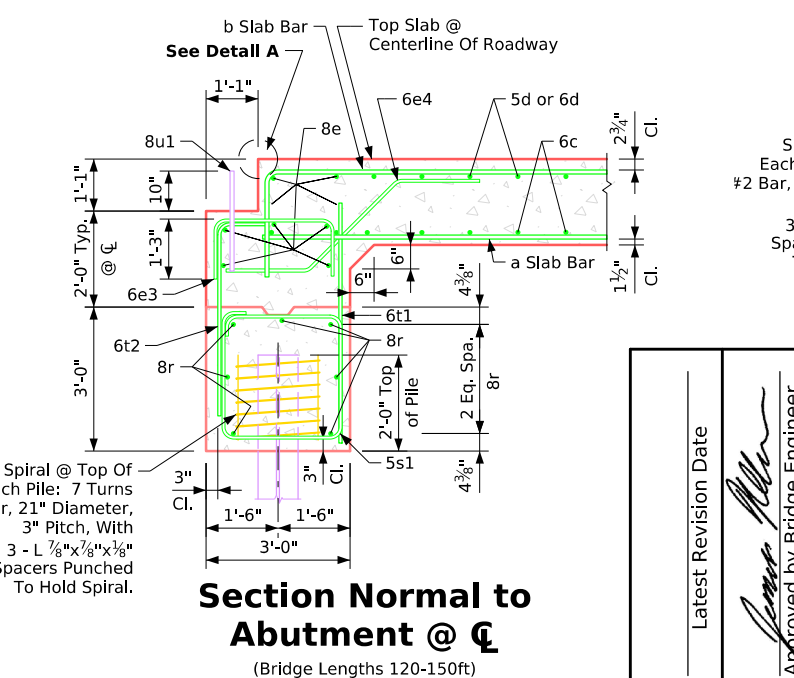
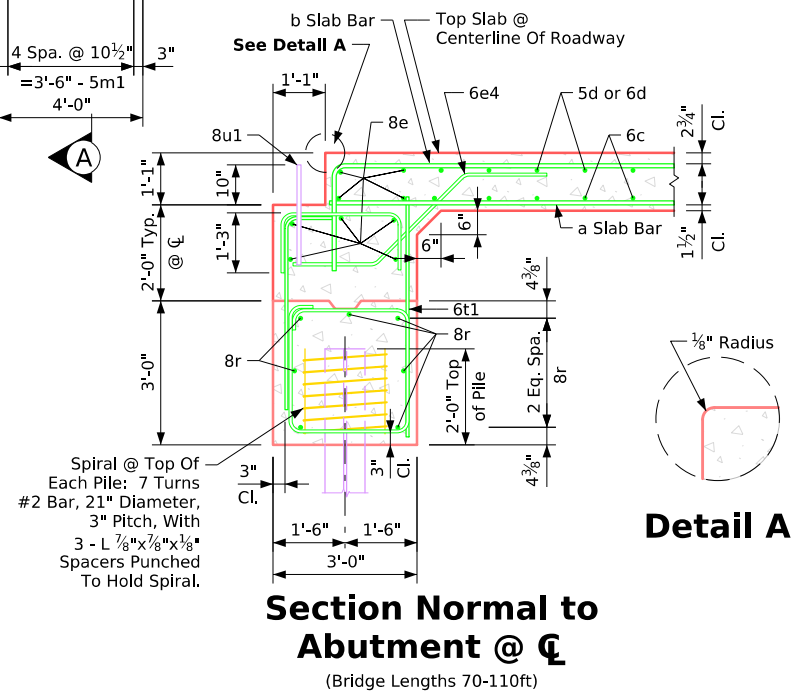
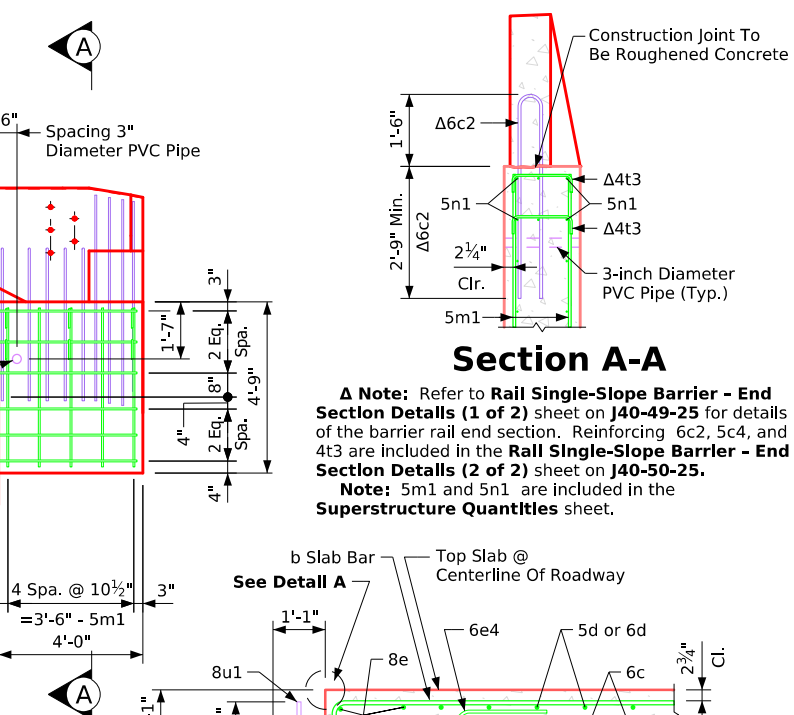
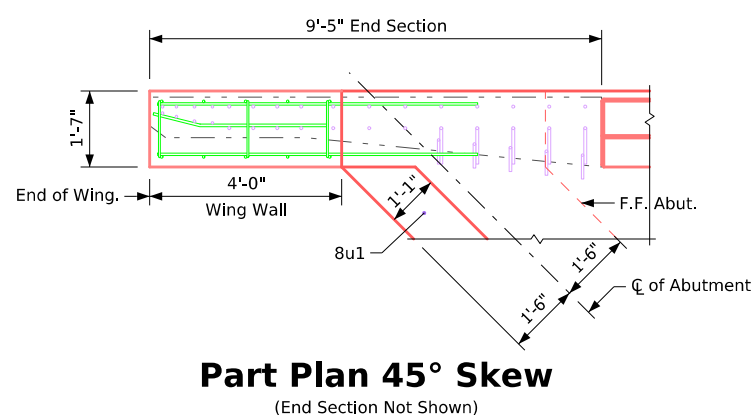
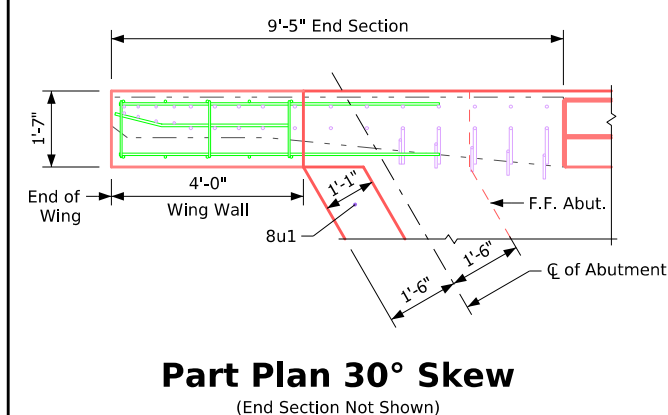
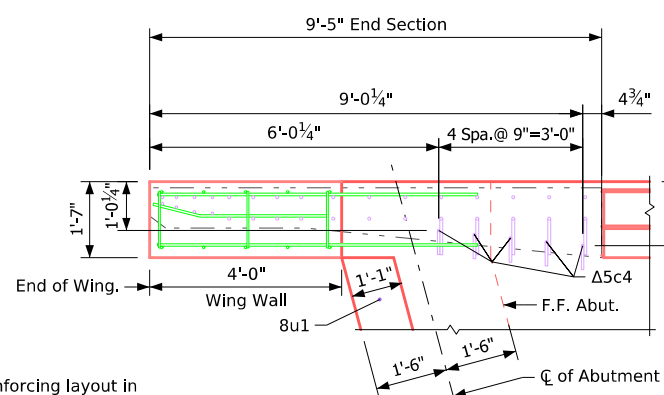
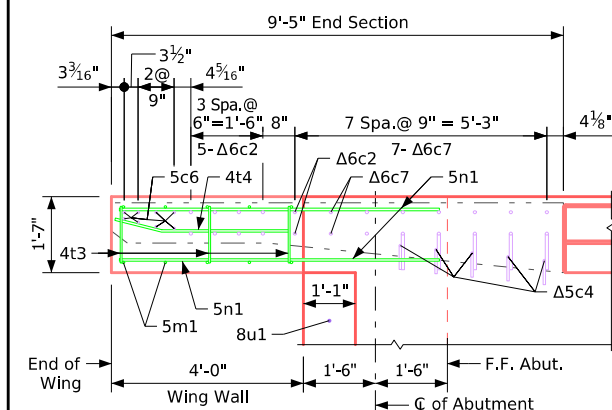
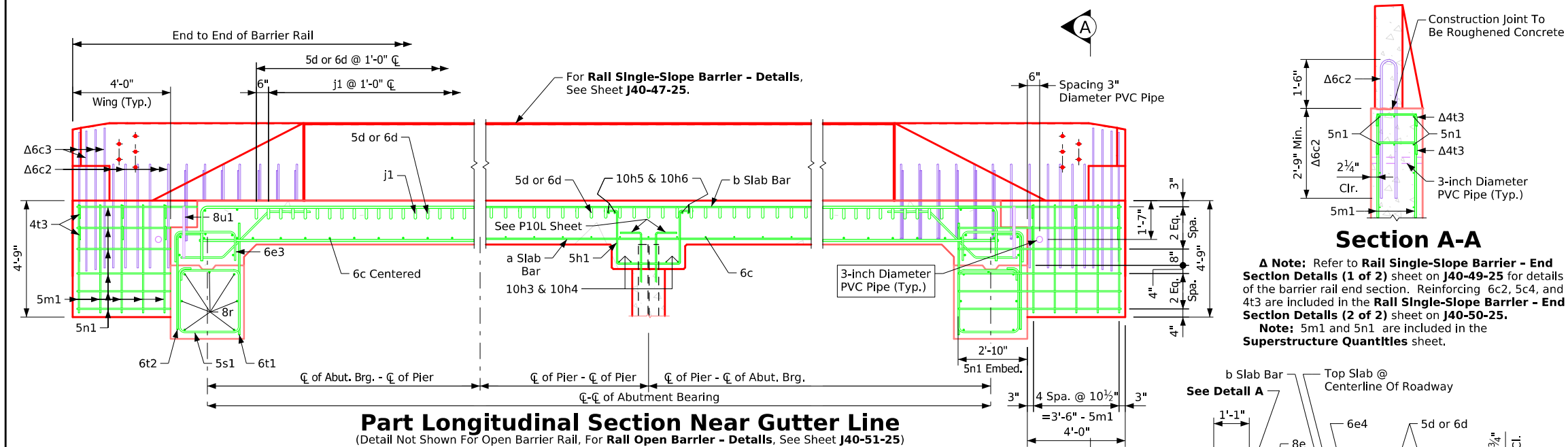
150' - Placement for Longitudinal Reinforcement



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



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.

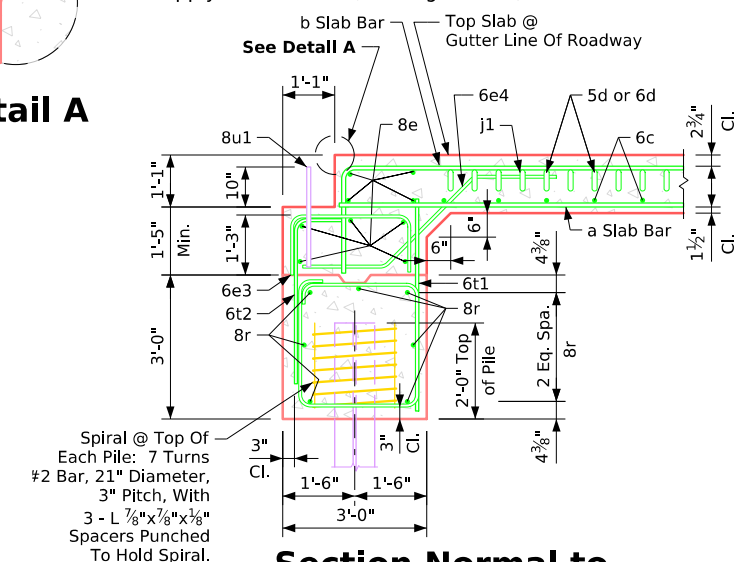
The concrete slab is to be placed with a minimum of construction joints. Procedures for placing slab concrete shall be submitted for approval, together with a statement of the proposed method and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required 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)".

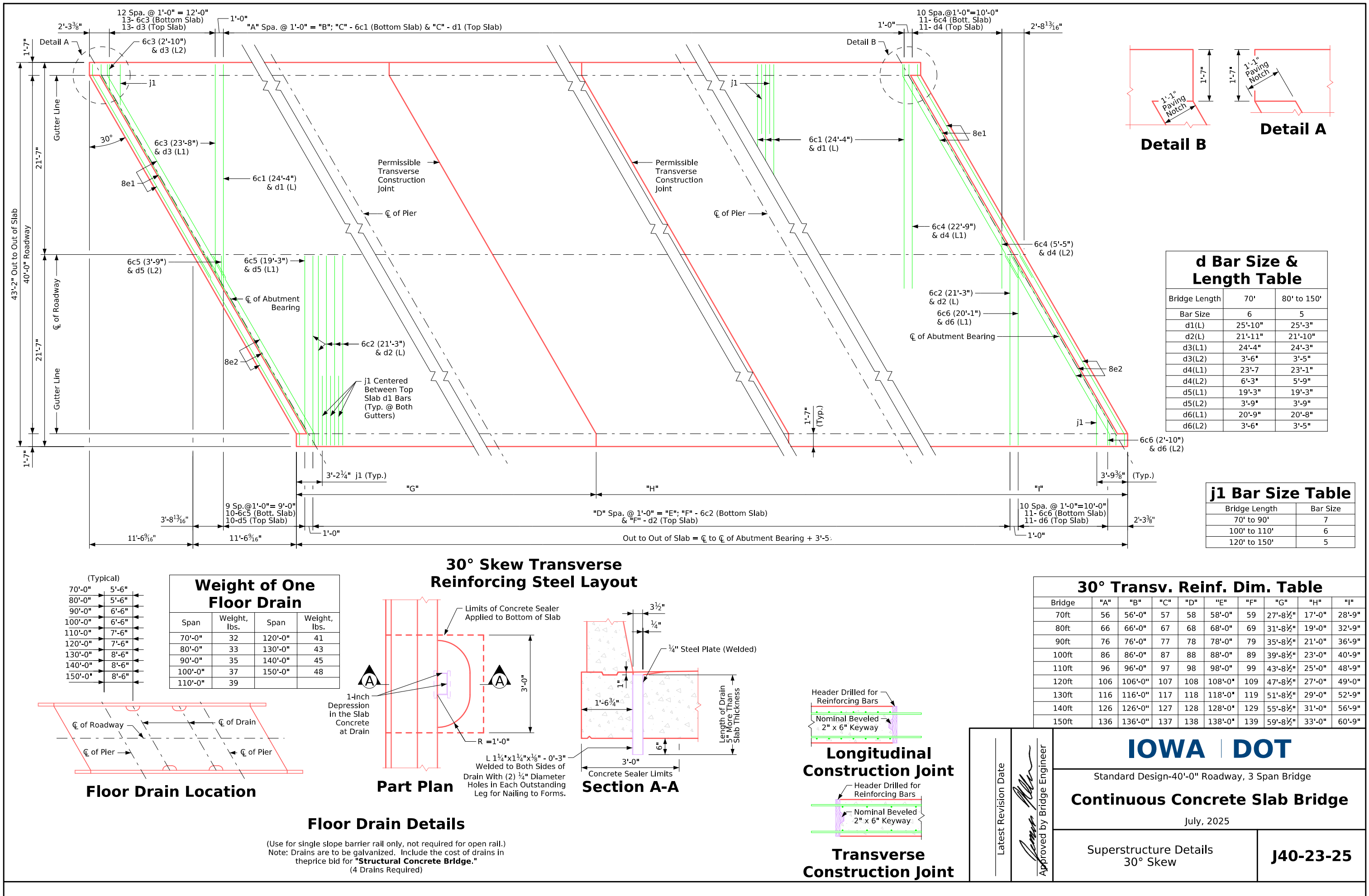
Bar Chair Note:

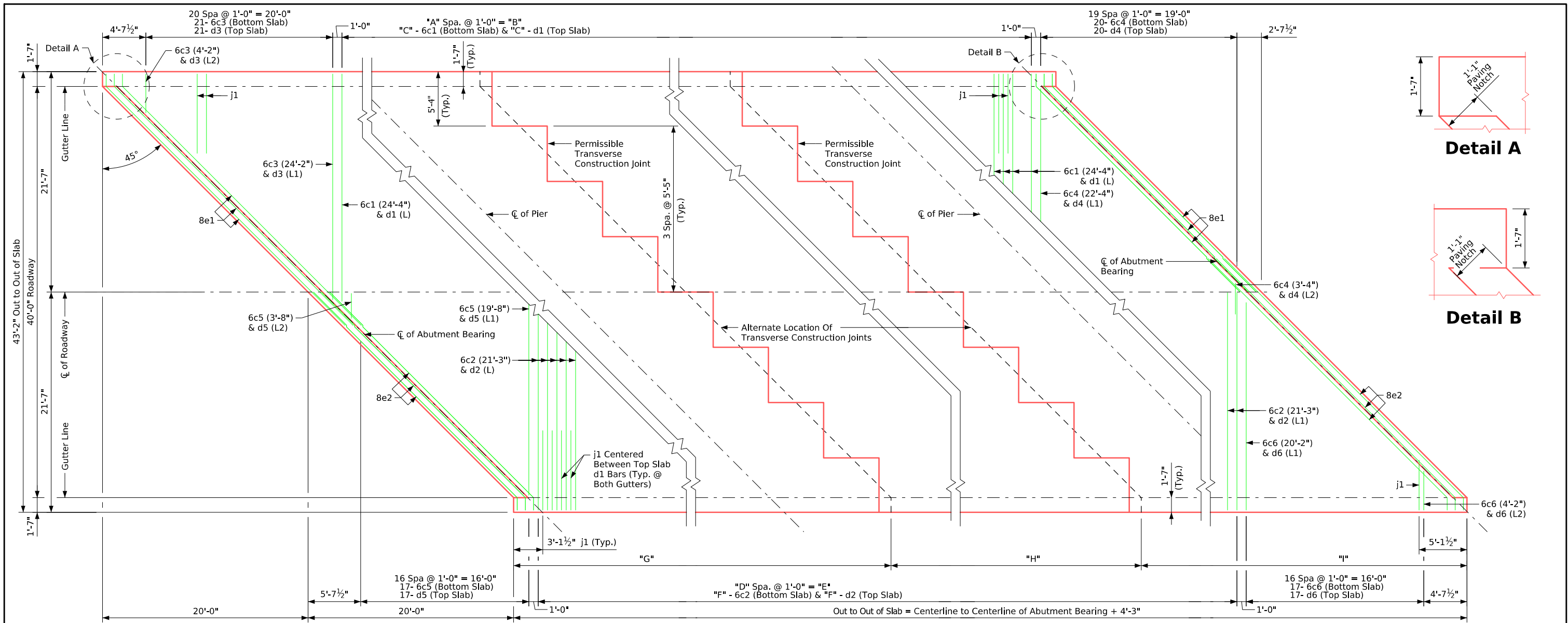
The top mat of reinforcing steel is to be supported by individual bar chairs spaced at no more than 3'-0" centers longitudinally and transversely. The bottom mat of reinforcing steel is to be supported by individual bar chairs spaced at no more than 3'-0" centers longitudinally and transversely, or by 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.



Section Normal to Abutment @ Gutter Line

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





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

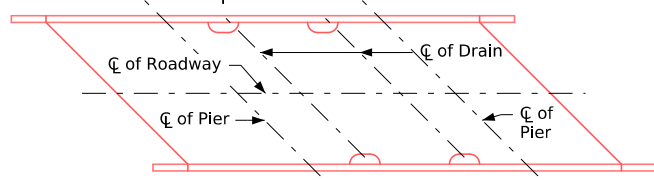
Bridge Length	70'	80' to 150'
Bar Size	6	5
d1(L)	25'-10"	25'-3"
d2(L)	21'-11"	21'-10"
d3(L1)	24'-10"	24'-9"
d3(L2)	4'-10"	4'-9"
d4(L1)	23'-2"	22'-8"
d4(L2)	4'-2"	3'-8"
d5(L1)	19'-8"	19'-8"
d5(L2)	3'-8"	3'-8"
d6(L1)	20'-10"	20'-9"
d6(L2)	4'-10"	4'-9"

(Typical)

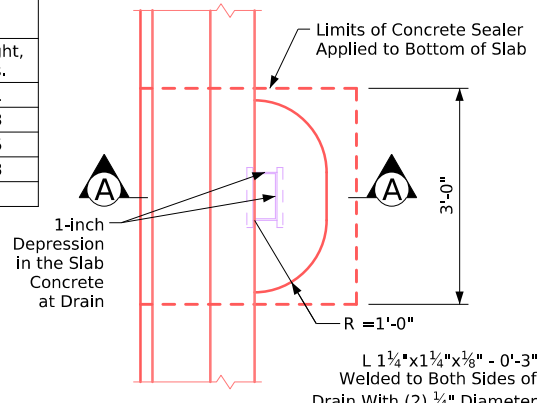
70'-0"	5'-6"
80'-0"	5'-6"
90'-0"	6'-6"
100'-0"	6'-6"
110'-0"	7'-6"
120'-0"	7'-6"
130'-0"	8'-6"
140'-0"	8'-6"
150'-0"	8'-6"

Weight of One Floor Drain

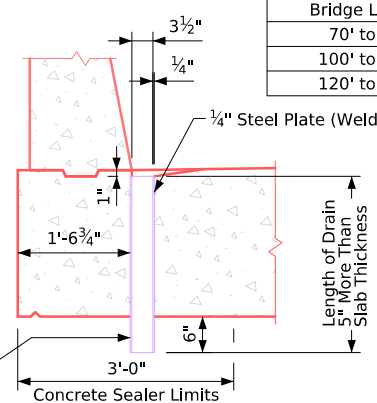
Span	Weight, lbs.	Span	Weight, lbs.
70'-0"	32	120'-0"	41
80'-0"	33	130'-0"	43
90'-0"	35	140'-0"	45
100'-0"	37	150'-0"	48
110'-0"	39		



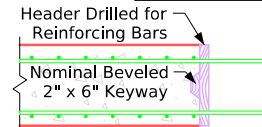
Floor Drain Location



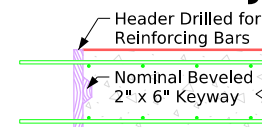
Part Plan



Section A-A



Longitudinal Construction Joint



Transverse Construction Joint

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

IOWA | DOT

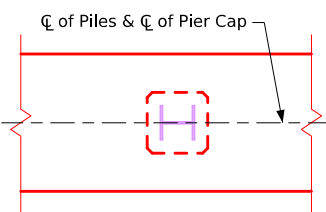
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

Superstructure Details
45° Skew

J40-24-25



	*Factored Loads And Number Of Piles Monolithic - 40' Roadway																								
	HP 10 x 42					HP 10 x 57					HP 12 x 53					HP 14 x 73					HP 14 x 89				
Bridge Length	Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	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																			
		Prestressed 14"					Prestressed 16"					Cast In Place 14"					Cast In Place 16"				
		Bridge Length	Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	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	
80'-0	998	11	11	11	11	1019	10	10	10	10	987	11	11	11	11	1005	9	9	10	10	
90'-0	1107	12	12	12	12	1130	11	11	11	11	1095	12	12	12	12	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	
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	
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	
130'-0	1617	N.A	N.A	N.A	17	1656	N.A	N.A	N.A	16	1601	N.A	N.A	N.A	17	1622	N.A	N.A	N.A	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	19	1775	N.A	N.A	N.A	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	

*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.

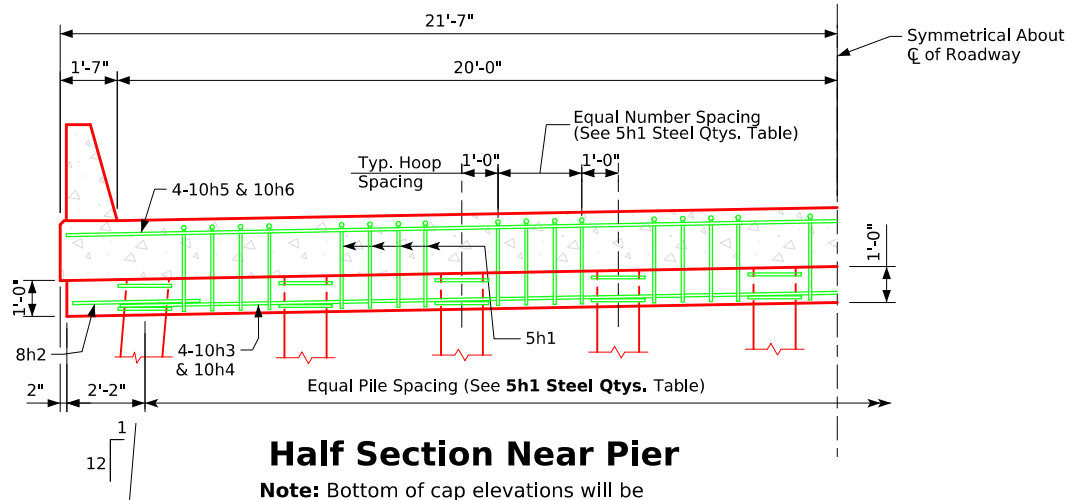
Concrete quantities are based on the use of Type 3 piling. If Type 1 or Type 2 is used, concrete quantities may be adjusted to account for the concrete displaced by the piling.

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.

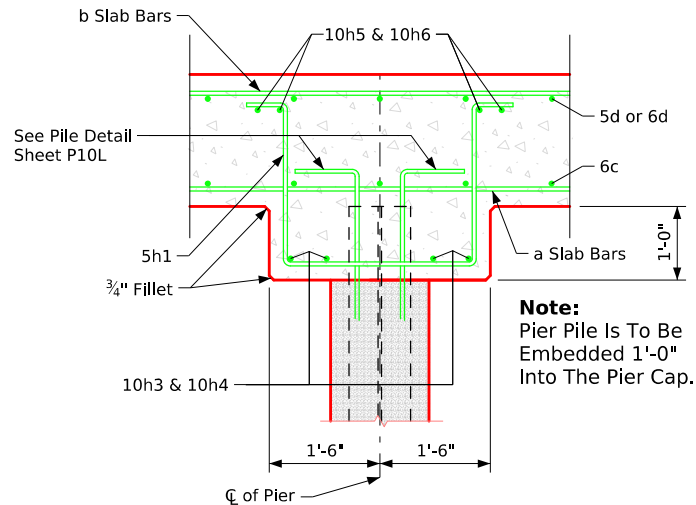
Note:
For Monolithic Pier Cap Details And Quantities, See Sheet **140-26-25.**

Latest Revision Date  Approved by Bridge Engineer	<h1>IOWA DOT</h1>	
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2>Continuous Concrete Slab Bridge</h2>	
	July, 2025	Pier Cap Monolithic Details All Bridges (1 of 2)
		<h1>J40-25-25</h1>



Half Section Near Pier

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



TYPICAL CAP SECTION

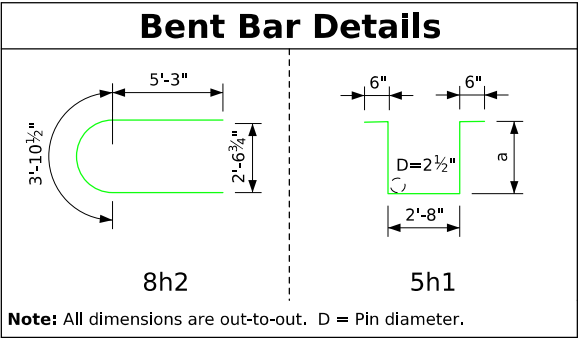
Note:
* Total weight shall be calculated by the Designer based on the type/size of piling used and the size of the bridge.

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		See 5h1 Bar Lengths Table	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	0° Skew			15° Skew			30° Skew			45° Skew		
		No.	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



5h1 bar Lengths

Bridge Length	a Dimension	Length	Wt/bar (lbs)
70'-0"	1'-7 1/2"	6'-11"	7
80'-0"	1'-8 1/4"	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

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

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"
Structural Concrete (Cu. Yds.)	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

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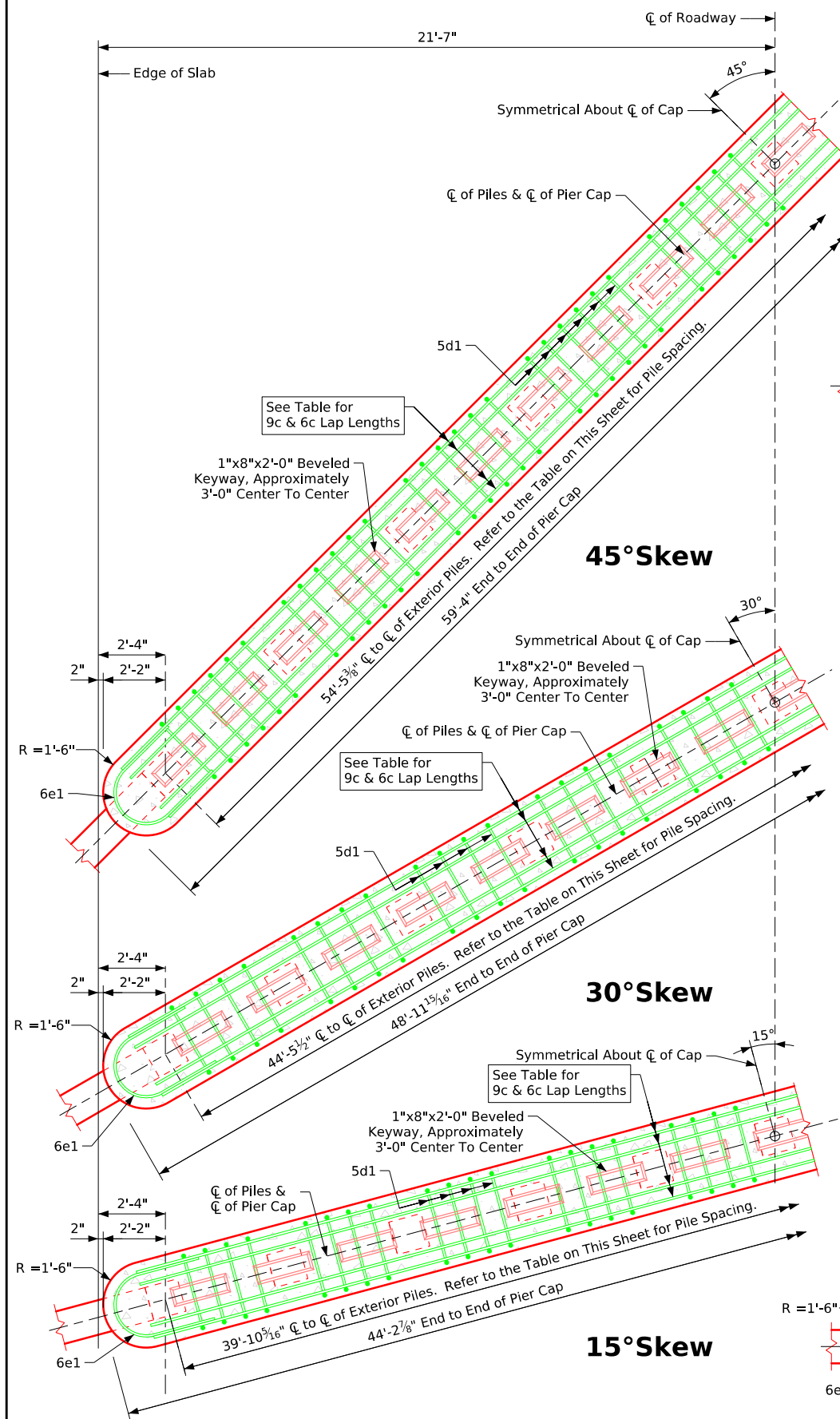
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

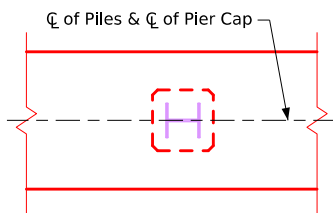
Pier Cap Monolithic
Details All Bridges (2 of 2)

J40-26-25



Half Section Below Slab

Note: The number of piles and stirrups shown are for a 100'-0" bridge w/ HP 10x42 piles. Cap dimensions are typical for all bridges.



Pile Orientation

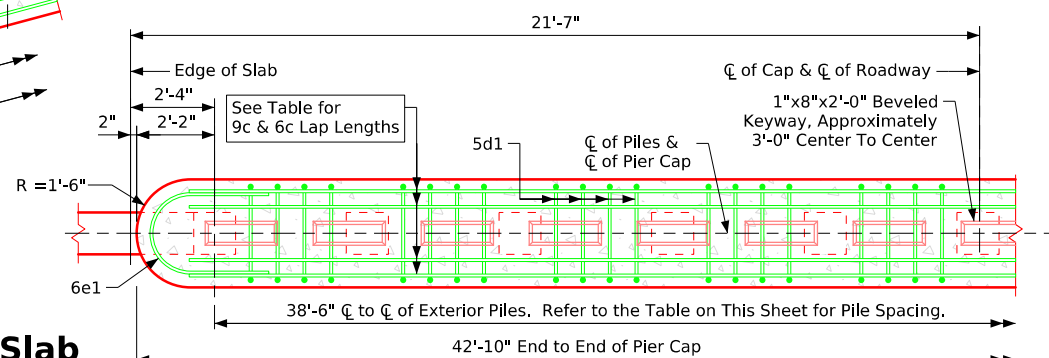
Type 3 Trestle Bent Piles.

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

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.



0° Skew

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

	HP 10 x 42					HP 10 x 57					HP 12 x 53					HP 14 x 73					HP 14 x 89				
Bridge Length	Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	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	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**

	Prestressed 14"					Prestressed 16"					Cast In Place 14"					Cast In Place 16"				
Bridge Length	Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles				Pu (kips)	Number of Piles			
		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.

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:

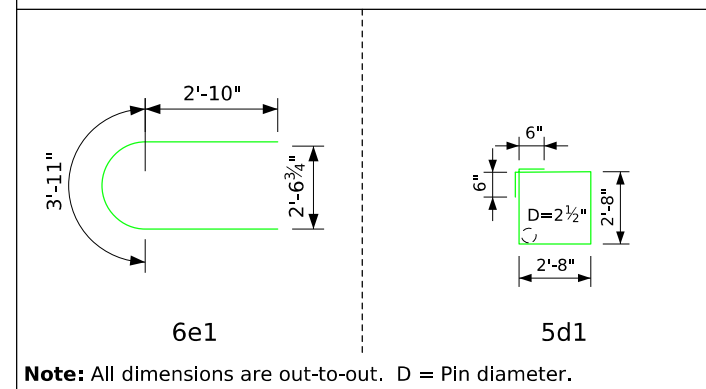
For Non-Monolithic Pier Cap Details And Quantities, See Sheet **J40-28-25**.

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



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

Bent Bar Details



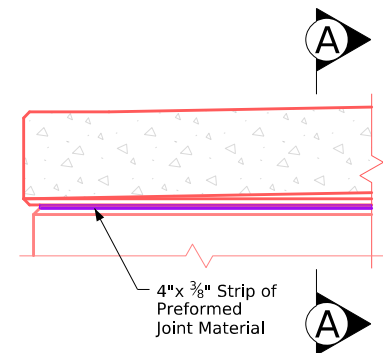
Est. Concrete Qty - Non-Monolithic One Pier 40' Roadway Width

Bridge Grade to Bottom of Cap Dimension

Diagram illustrating the placement of a bent-up bar (purple) within a slab. The bar is bent at a 45-degree angle. A dashed line from a black triangle labeled 'B' passes through the bar. Labels include: 'C of Pier Cap' (center of pier cap), '4" x 3/8" Strip Of Preformed Joint Material' (the bent-up bar), and 'Edge of Slab' (the right boundary of the slab).

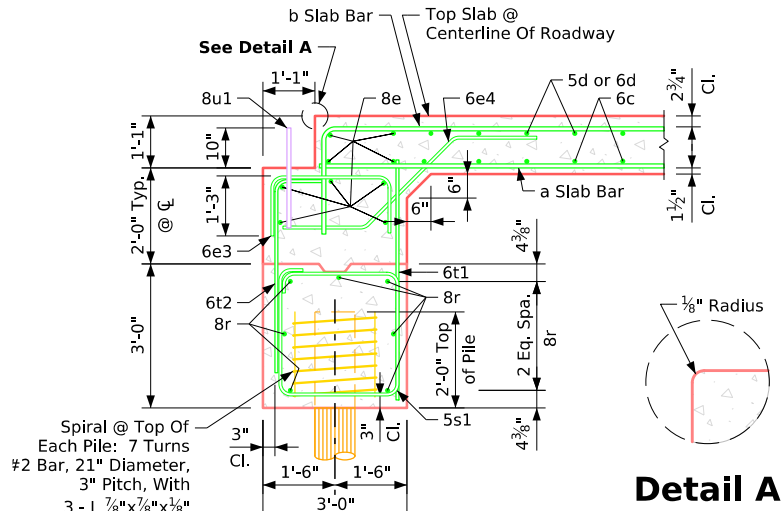
Part Plan

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.

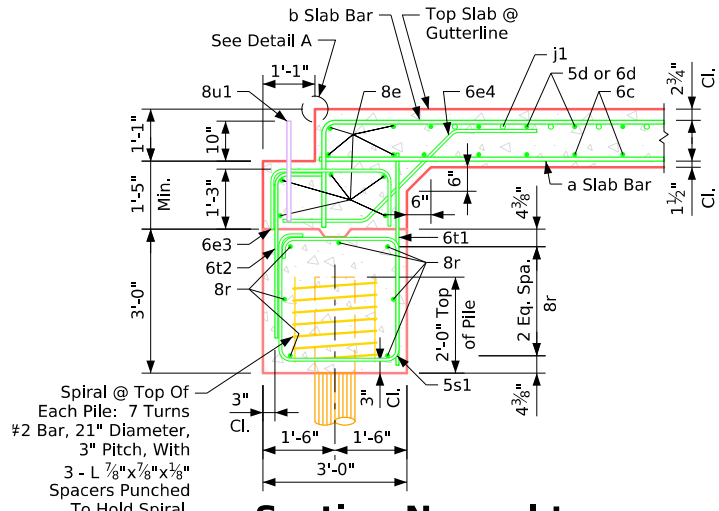


Part Section B-B

Part Section A-A



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.

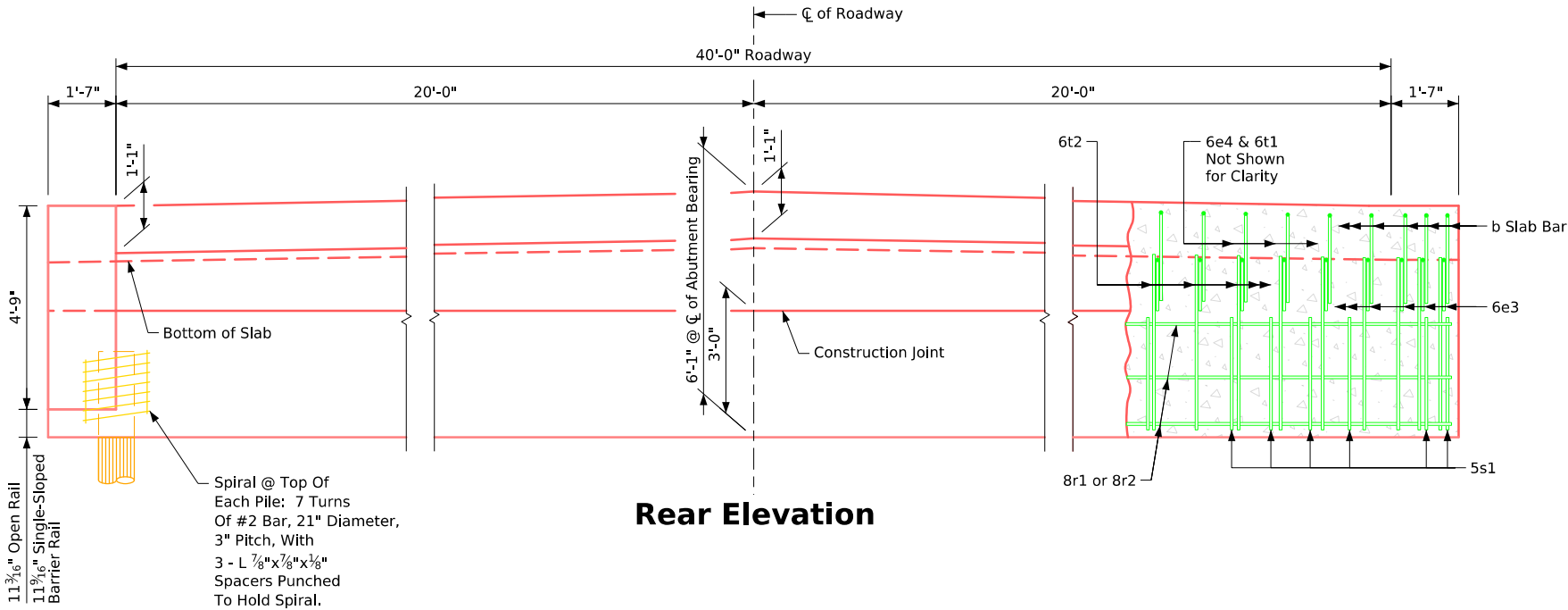
NOTES:

Barrier rails and reinforcement not shown.

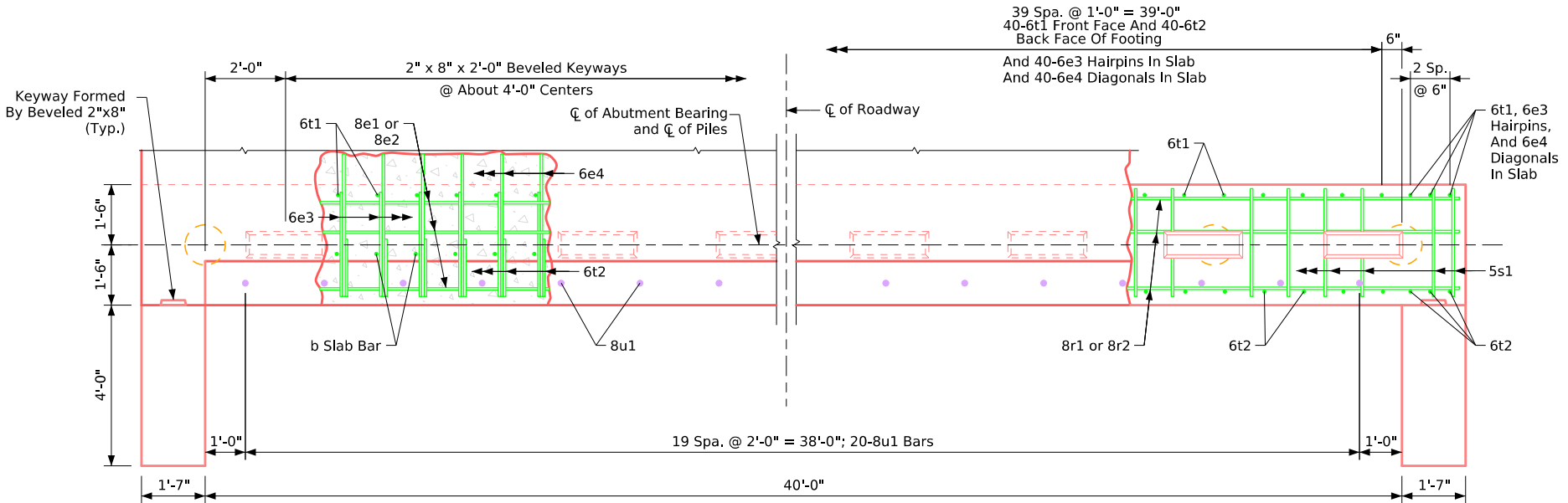
Wing reinforcement not shown.

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.



Rear Elevation



Plan View

Latest Revision Date

Approved by Bridge Engineer

IOWA | DOT

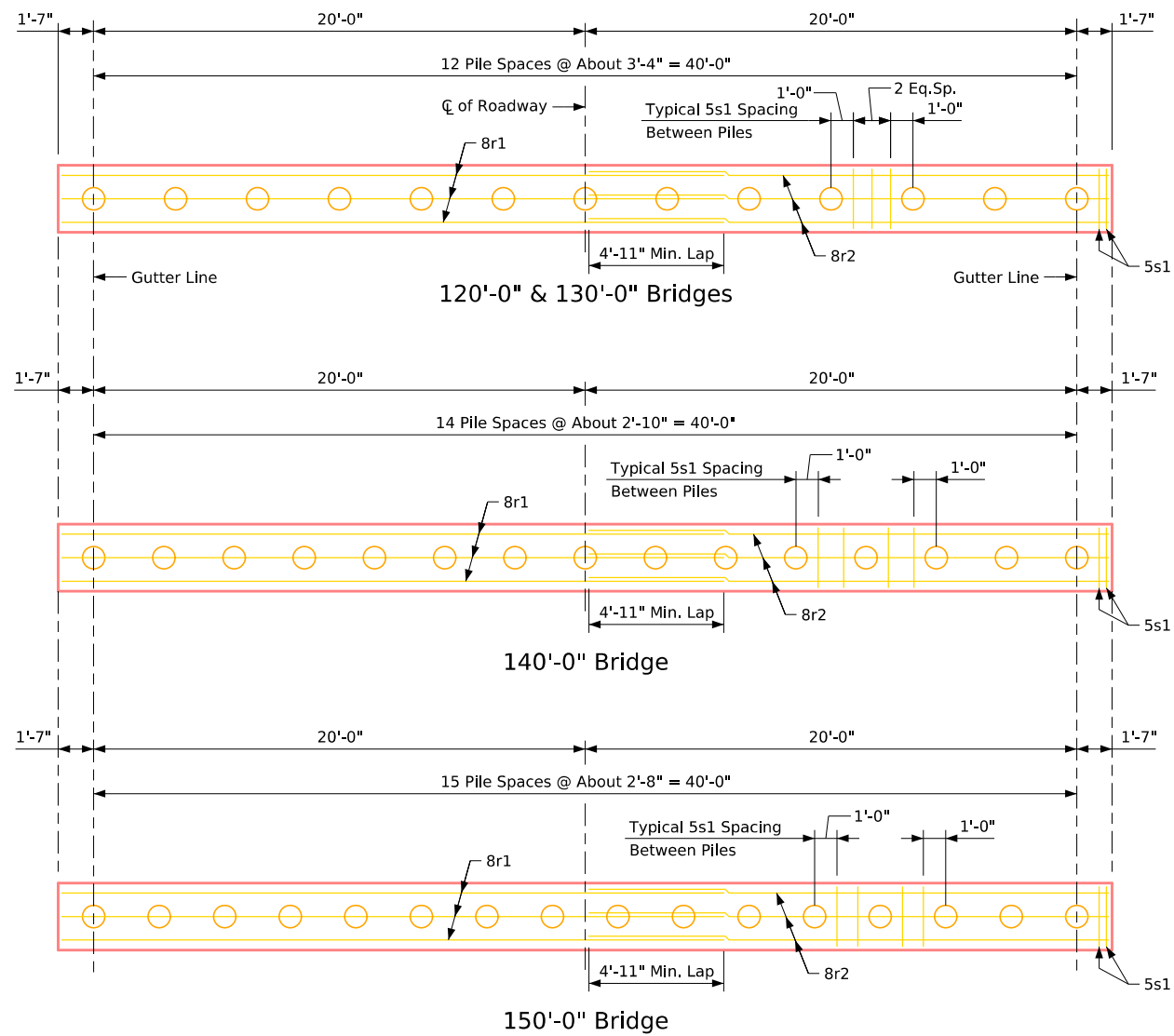
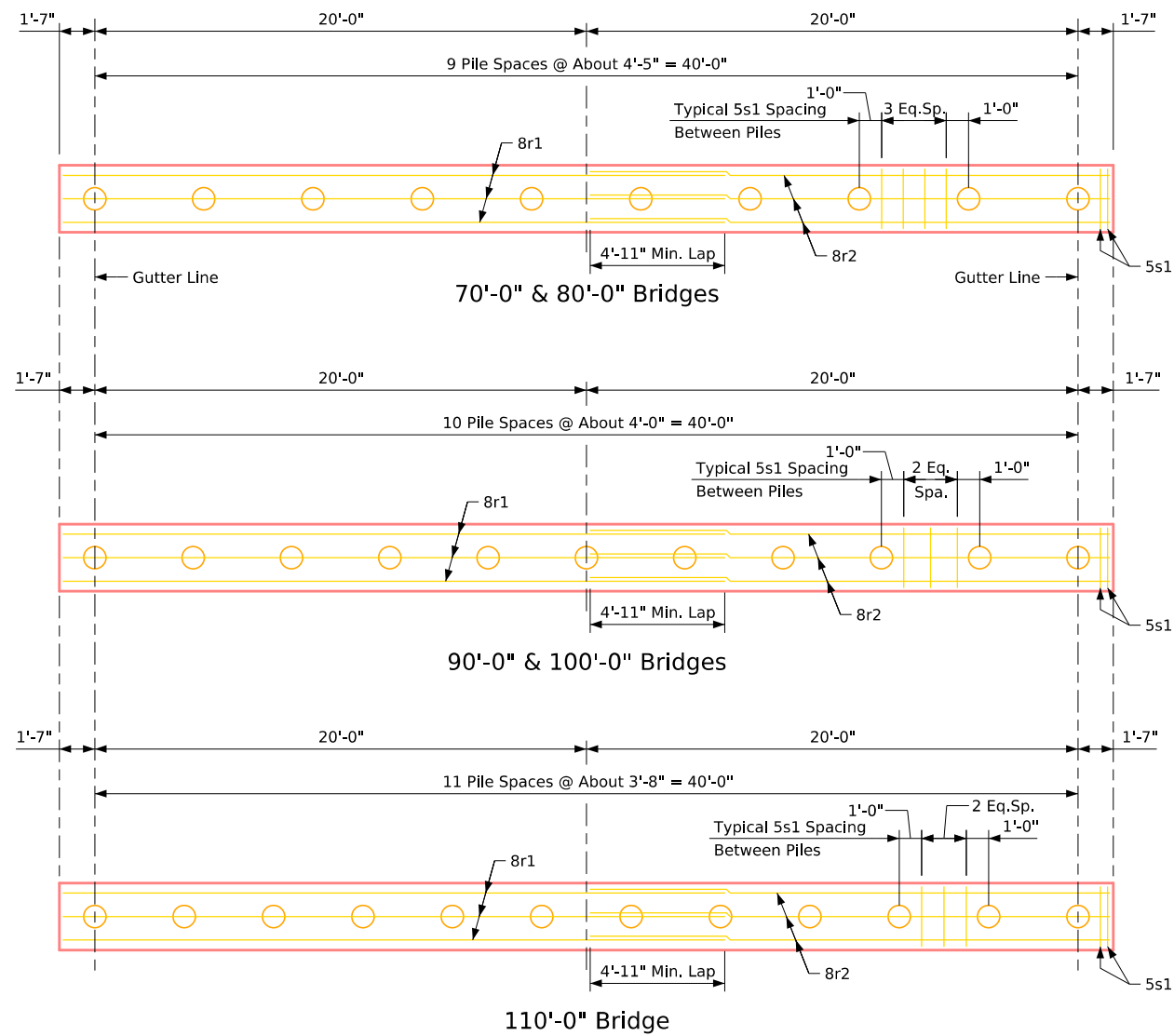
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

Abutment Details 0° Skew - 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

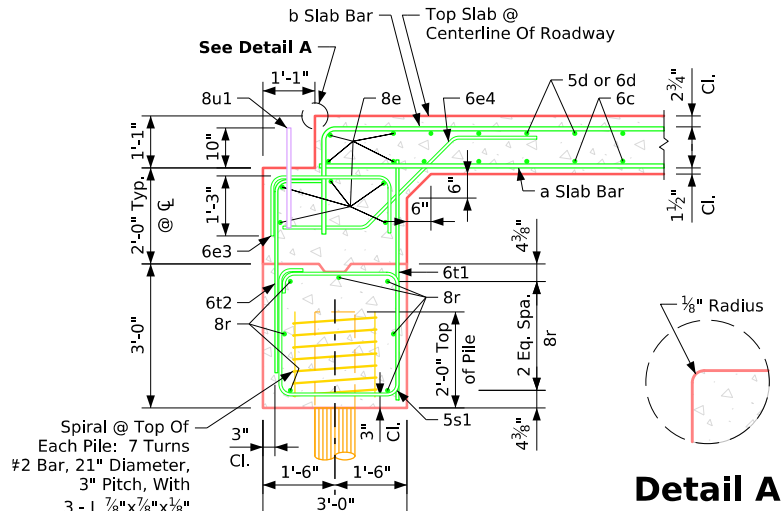
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

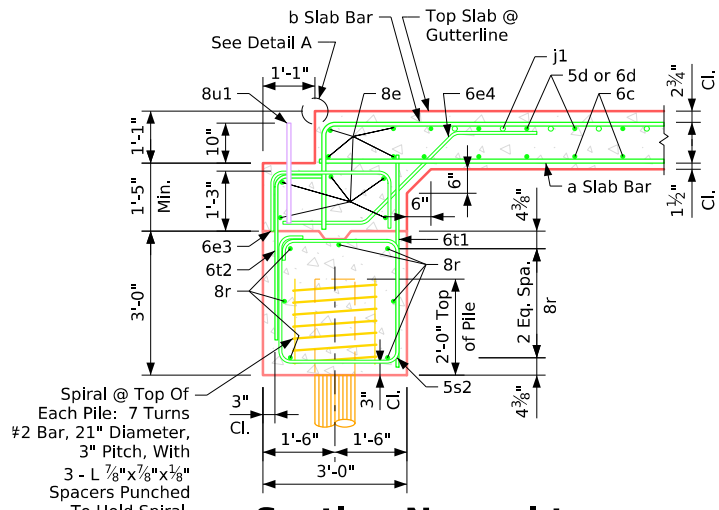
July, 2025

Abutment Details 0° Skew - Timber Piling (2 of 2)

J40-30-25



Section Normal to Abutment @ \mathcal{C}



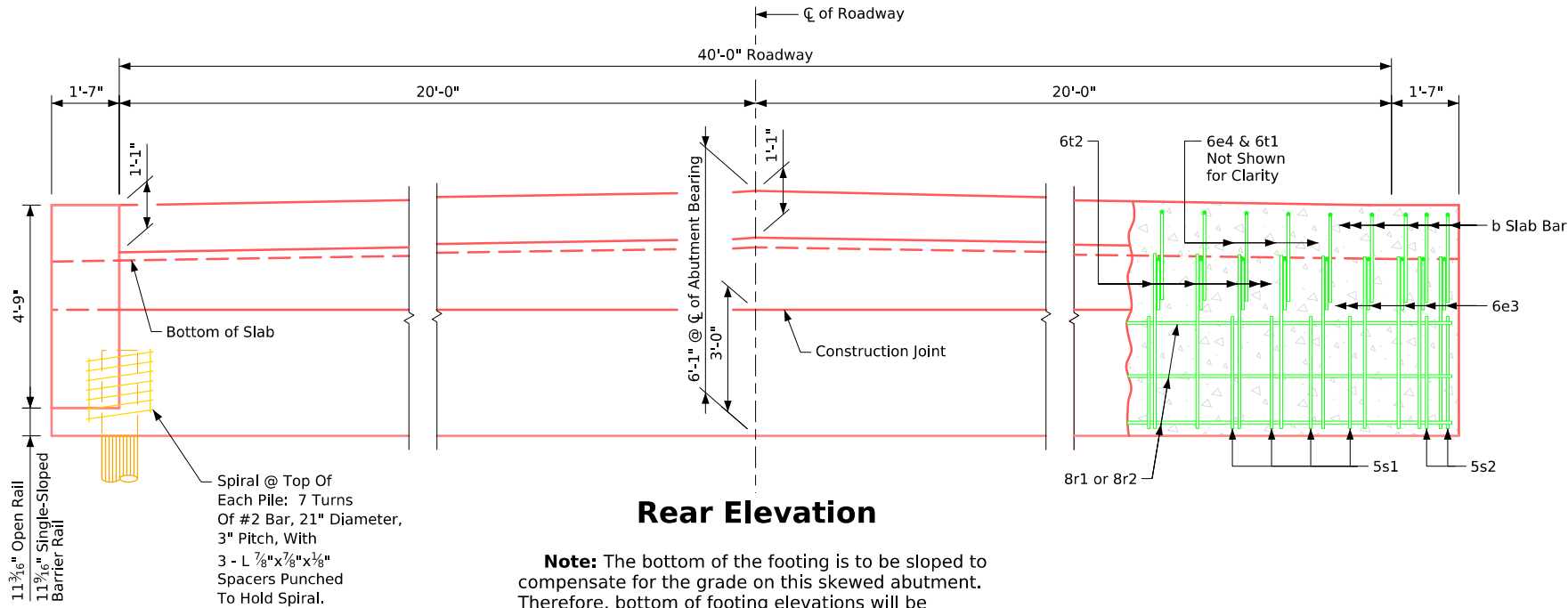
Section Normal to Abutment @ Gutter Line

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.

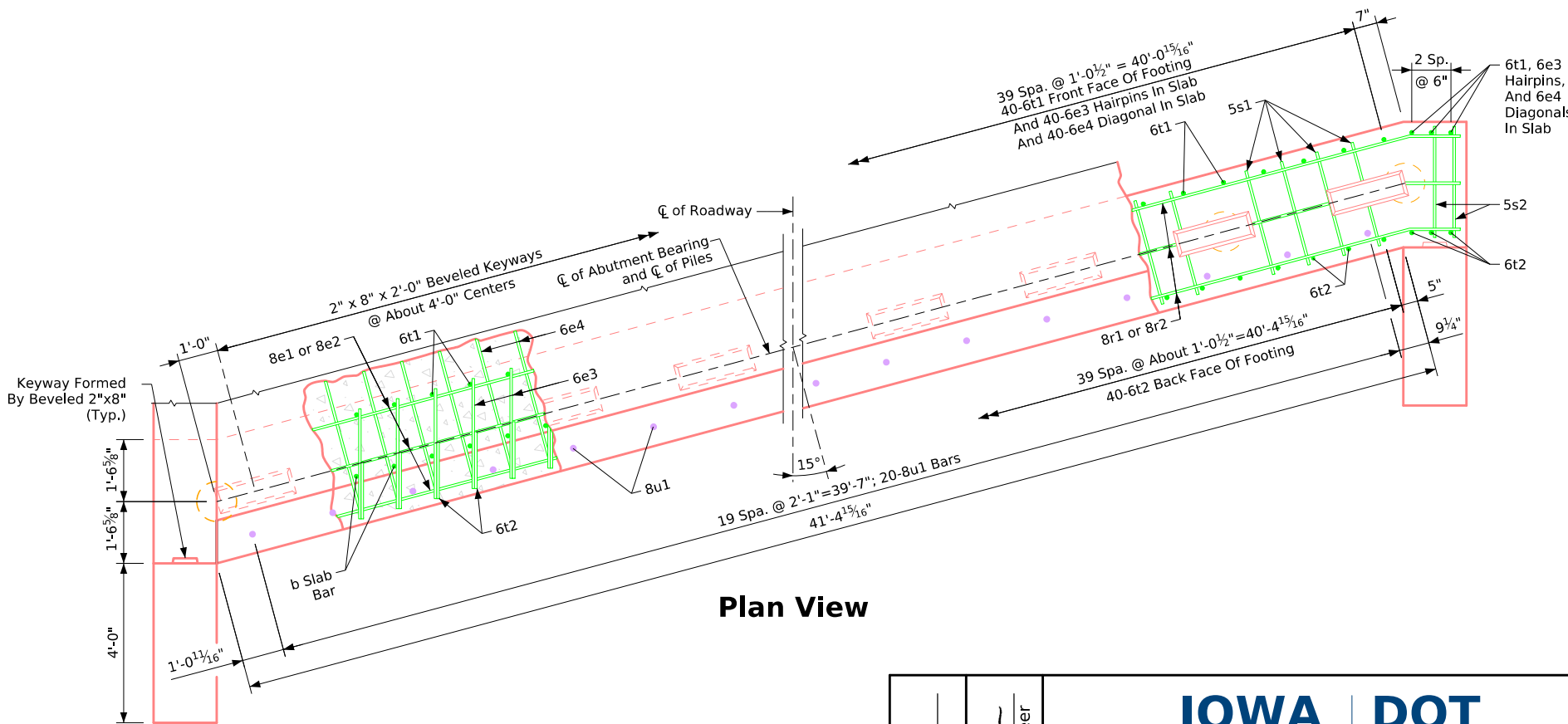
NOTES:

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.



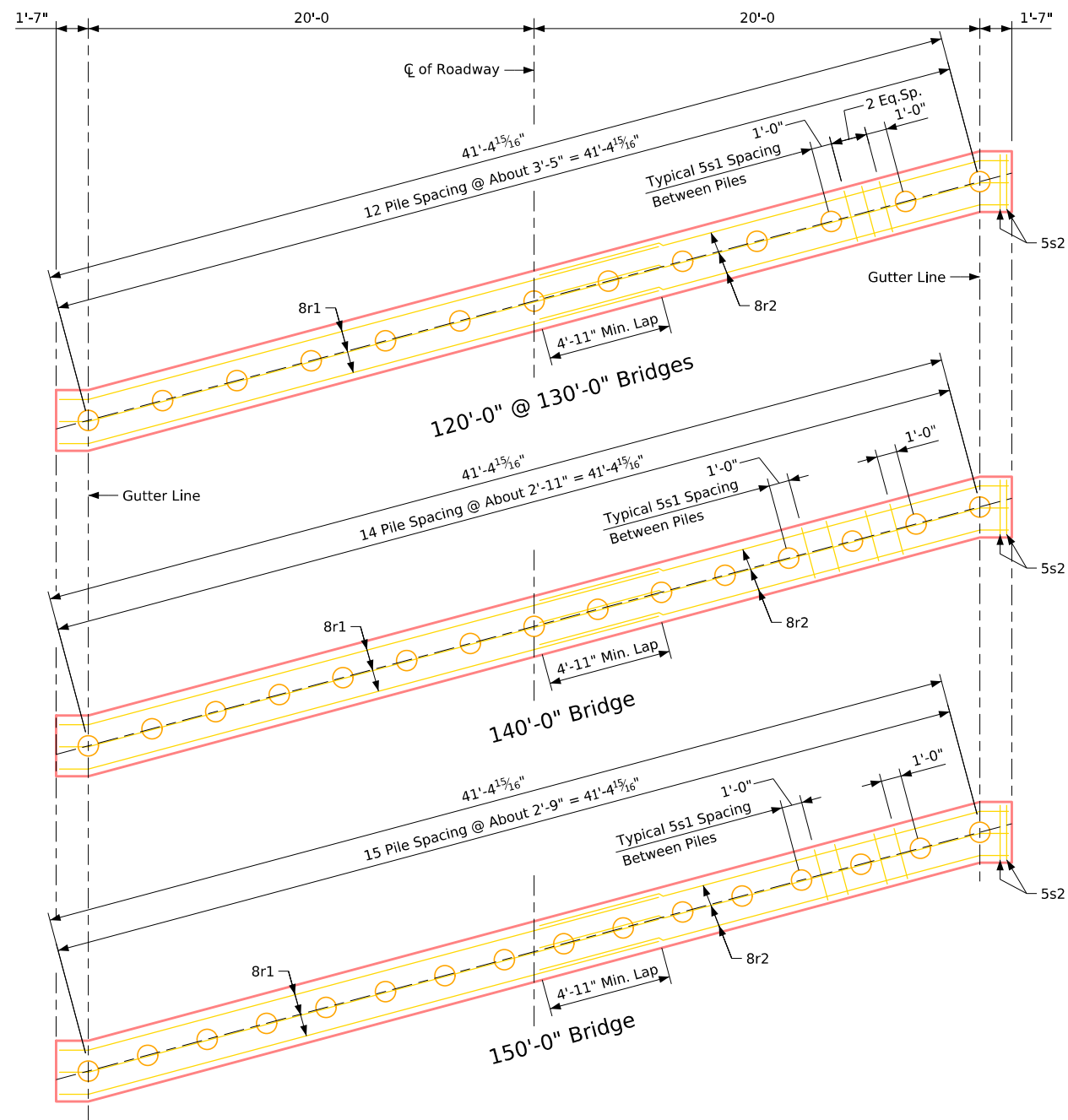
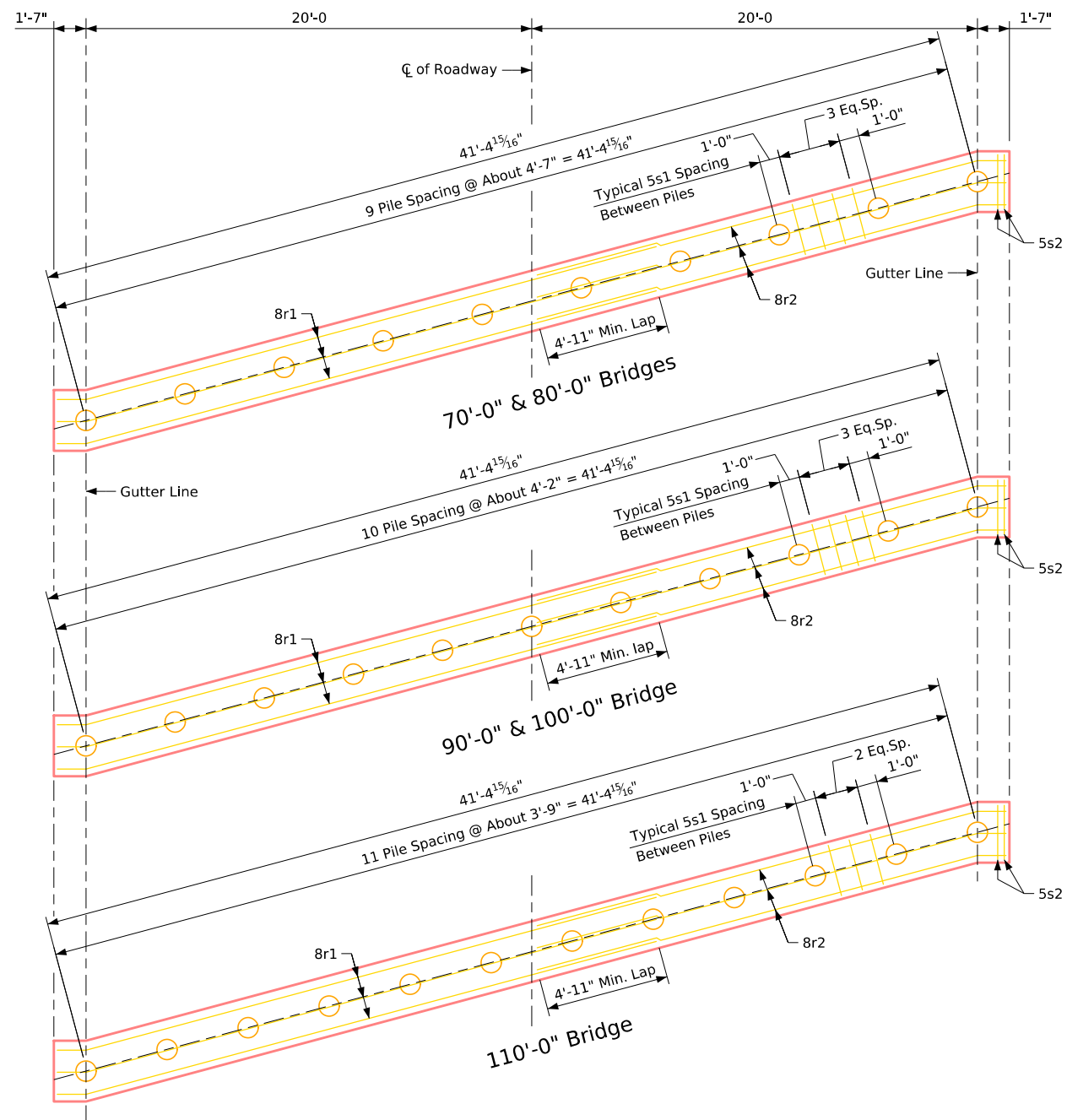
Rear Elevation

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	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer	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

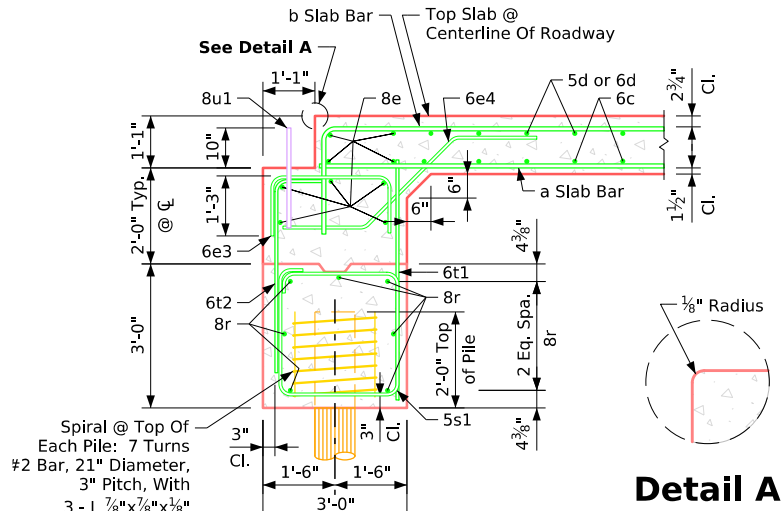
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

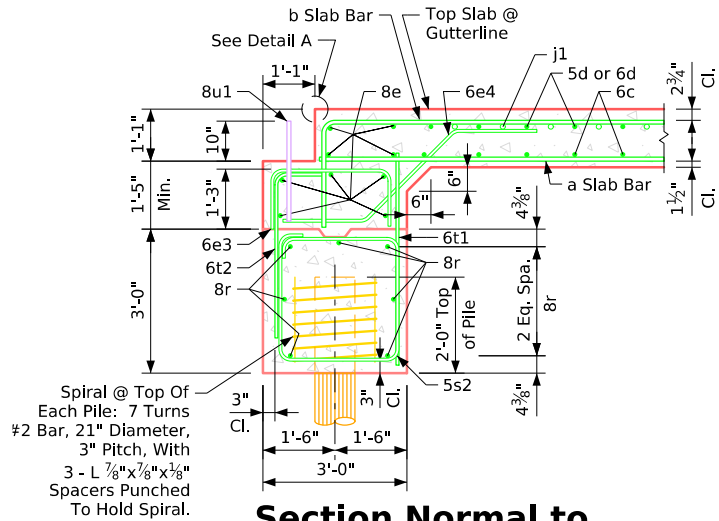
July, 2025

Abutment Details 15° Skew - Timber Piling (2 of 2)

J40-32-25



Section Normal to Abutment @ \mathcal{C}



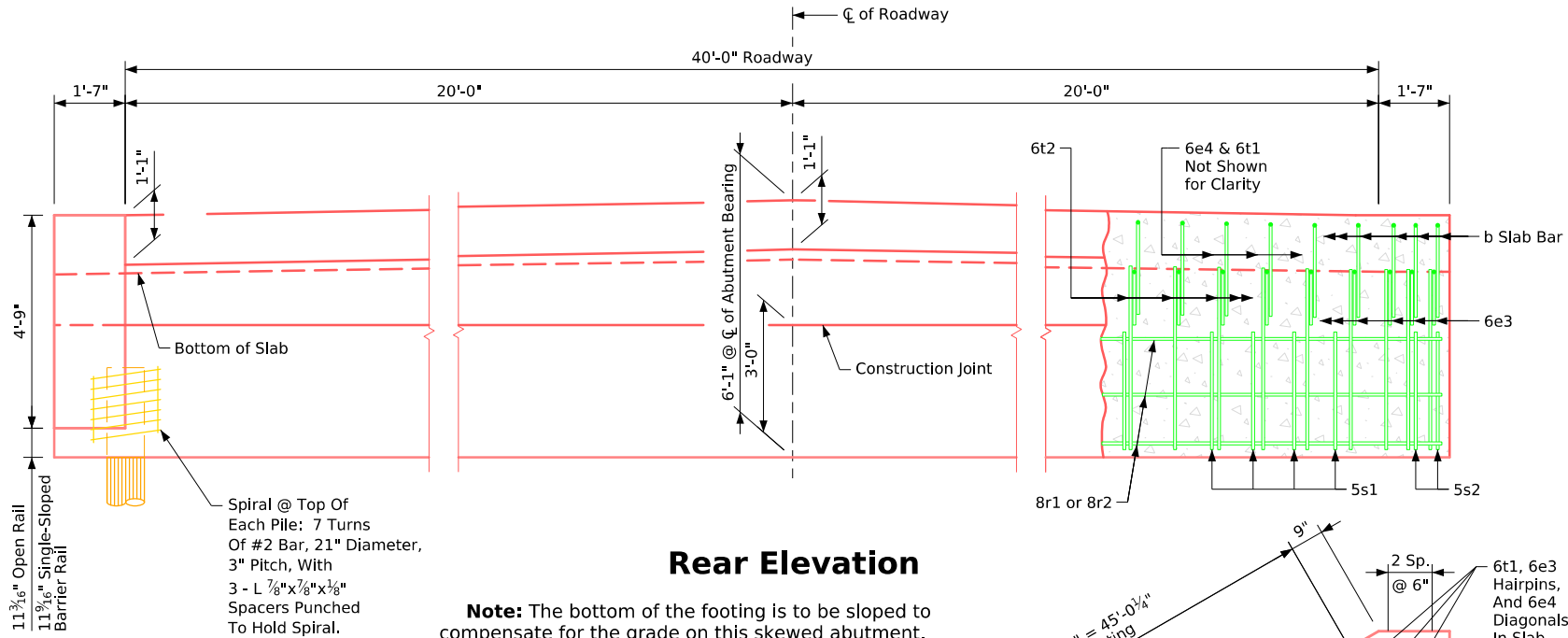
Section Normal to Abutment @ Gutter Line

ABUTMENT NOTES:

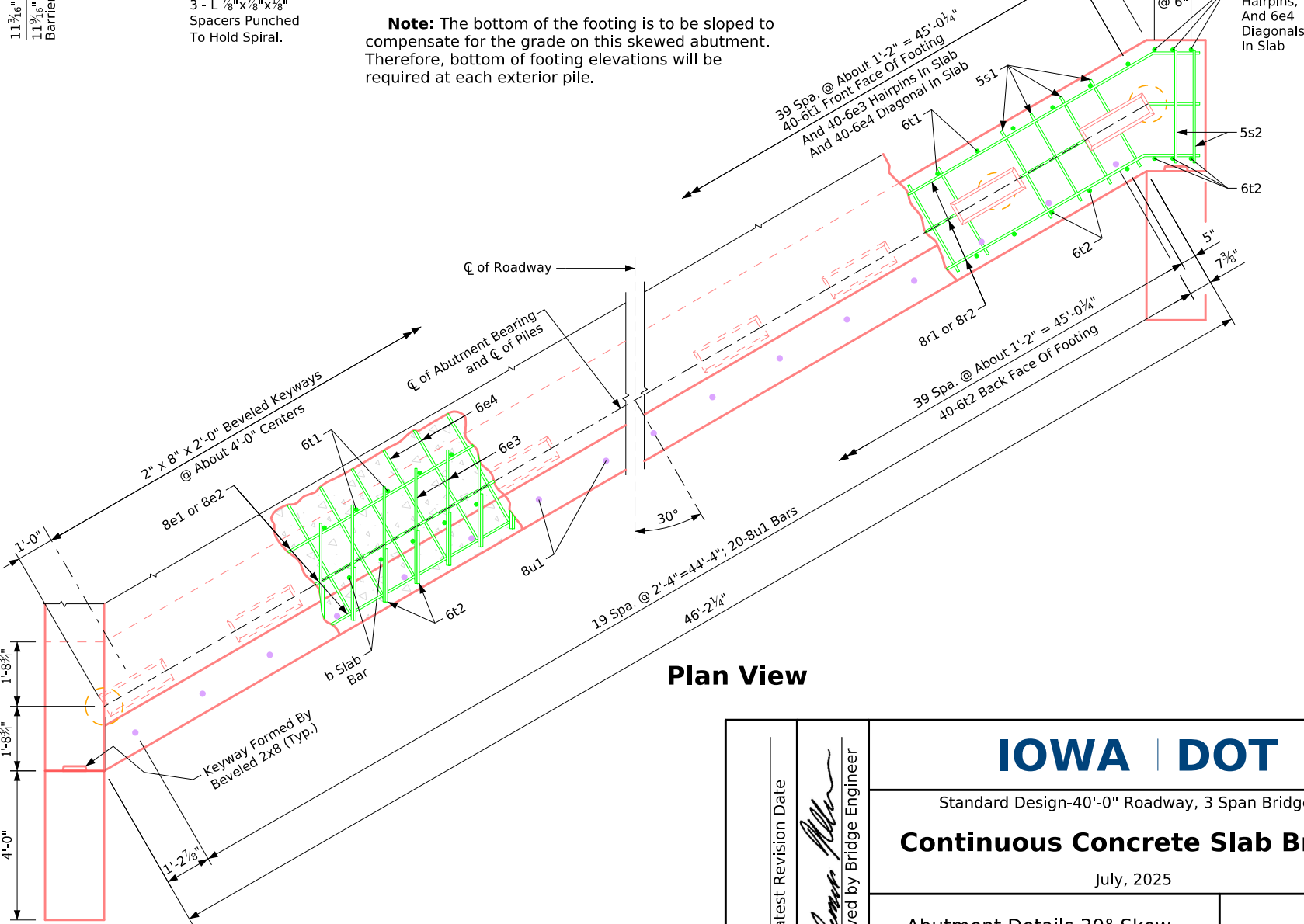
The concrete and reinforcing steel for the wings is included with the superstructure.
 Details on this sheet apply only when abutments are placed on timber piles.
 The minimum clear distance from the face of the concrete to the nearest reinforcing bar shall be 2 inches unless otherwise noted or shown.
 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.

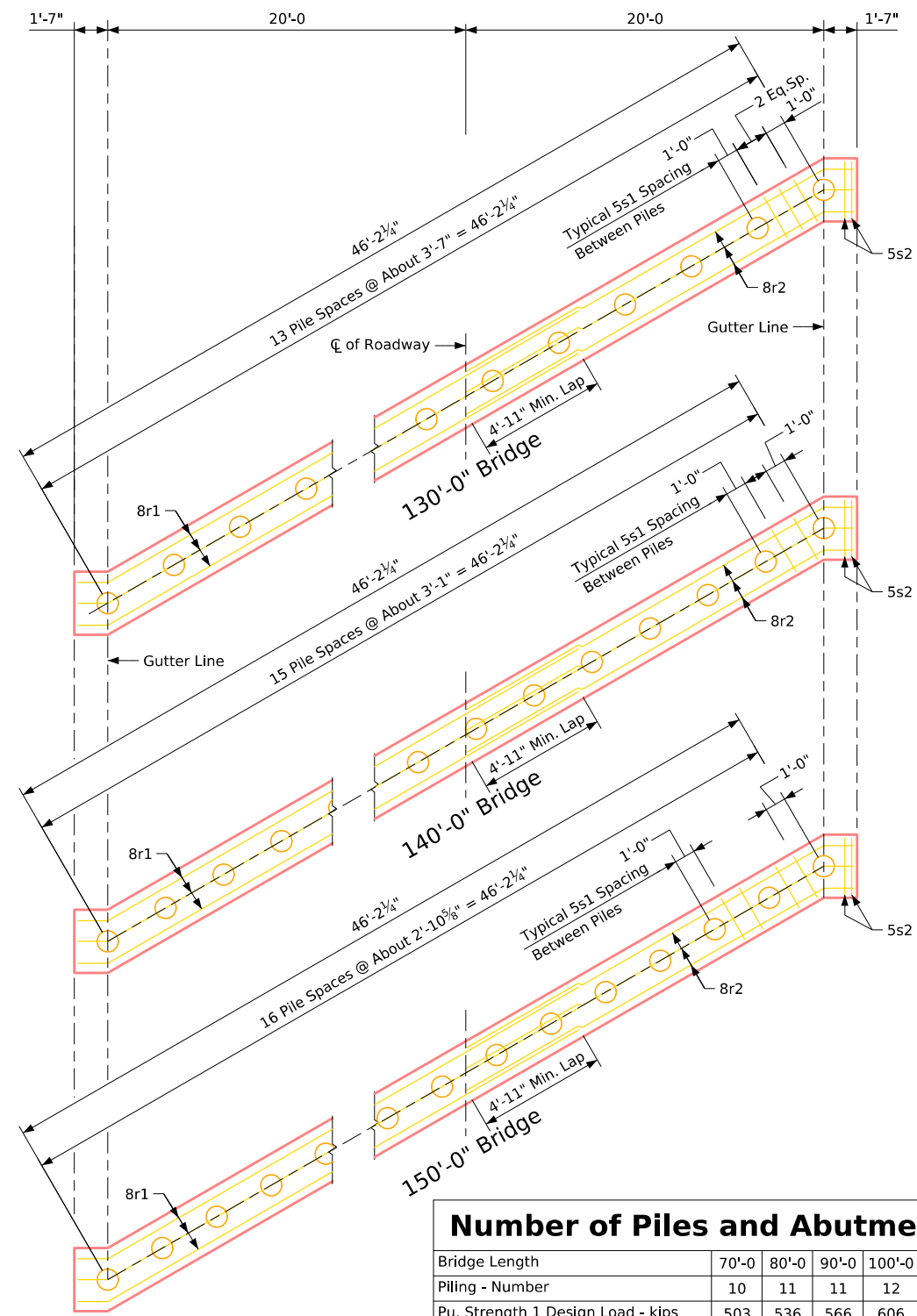
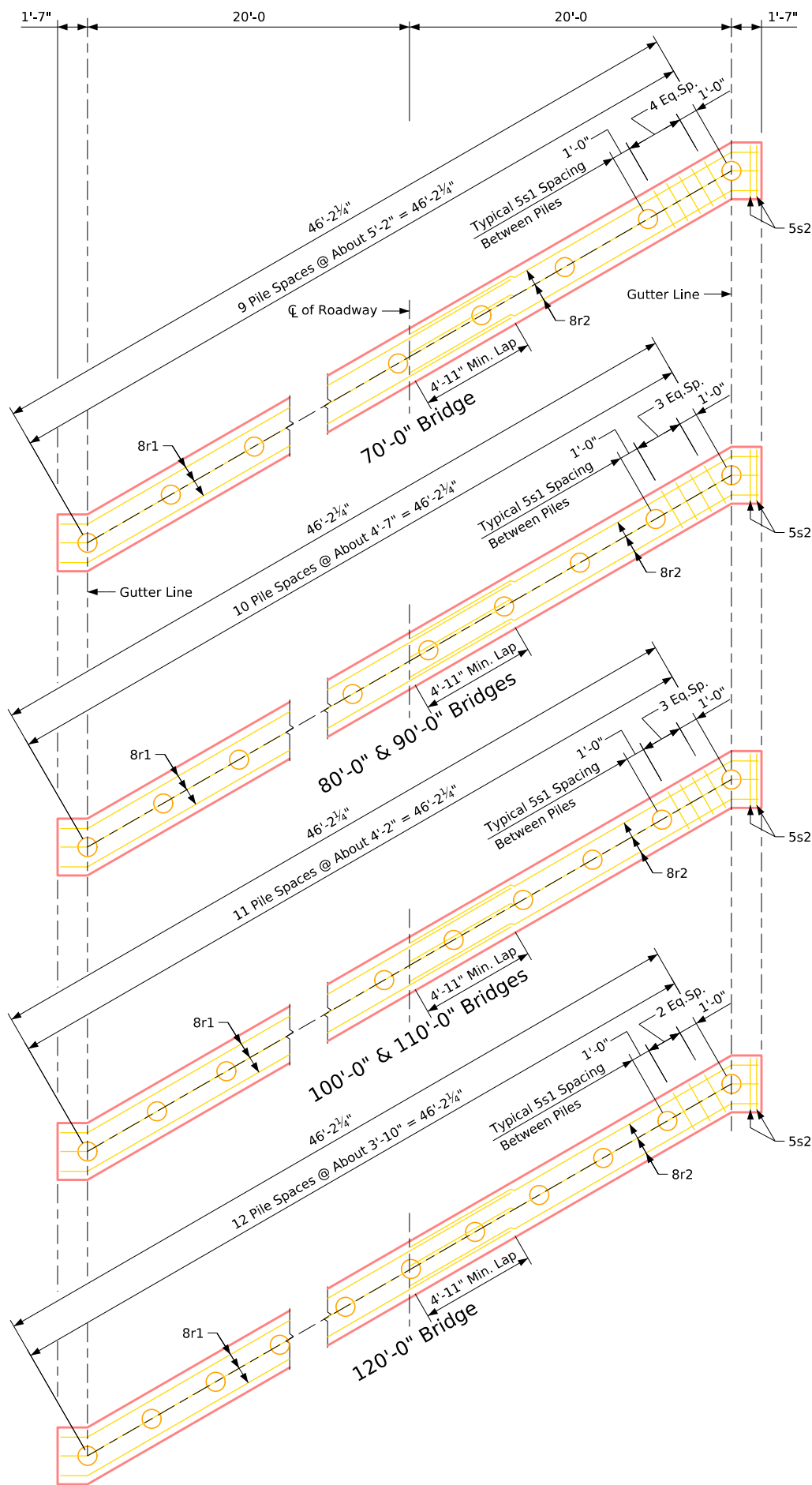


Rear Elevation



Plan View

Latest Revision Date	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer	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

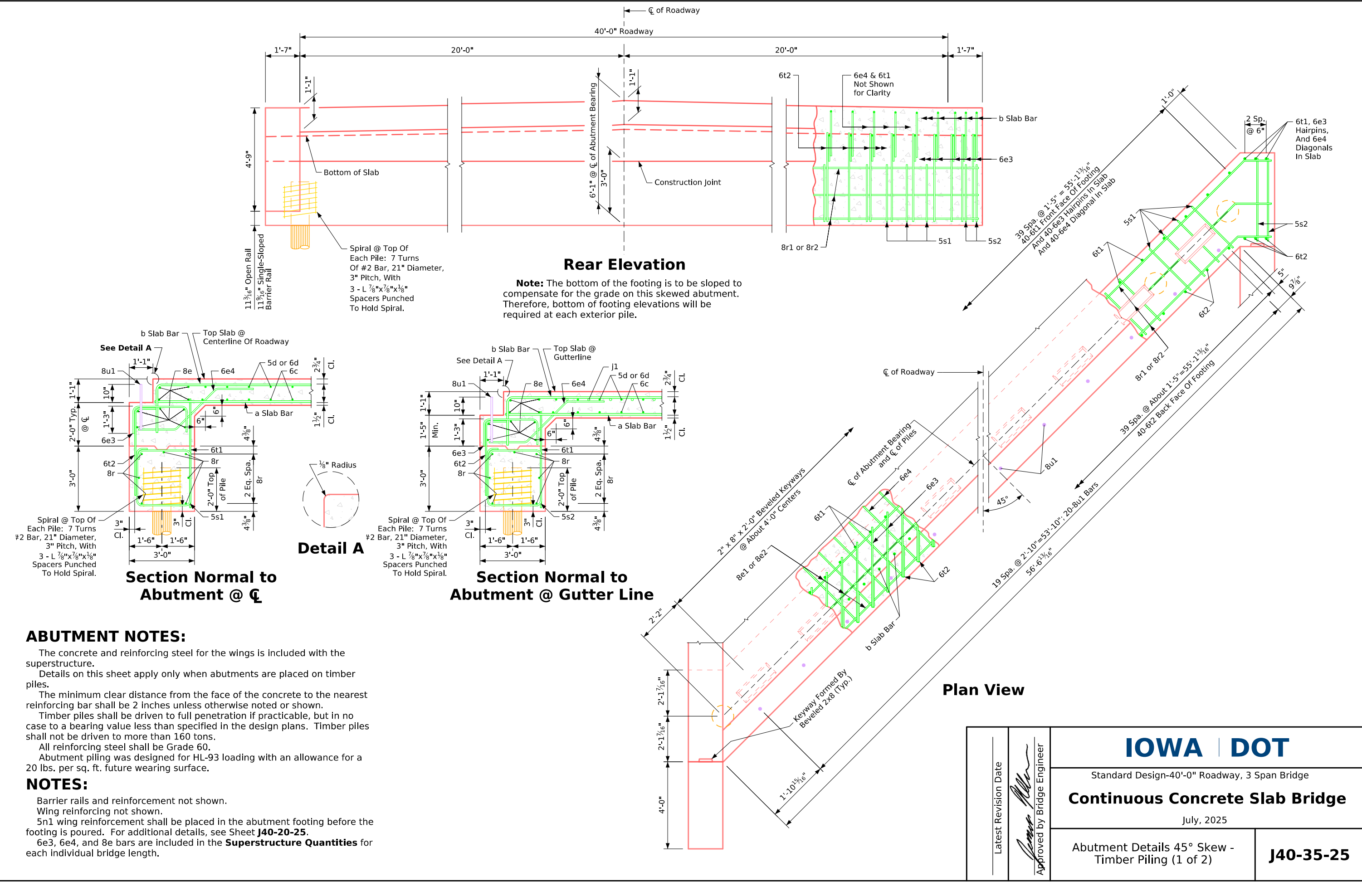
Standard Design-40'-0" Roadway, 3 Span Bridge

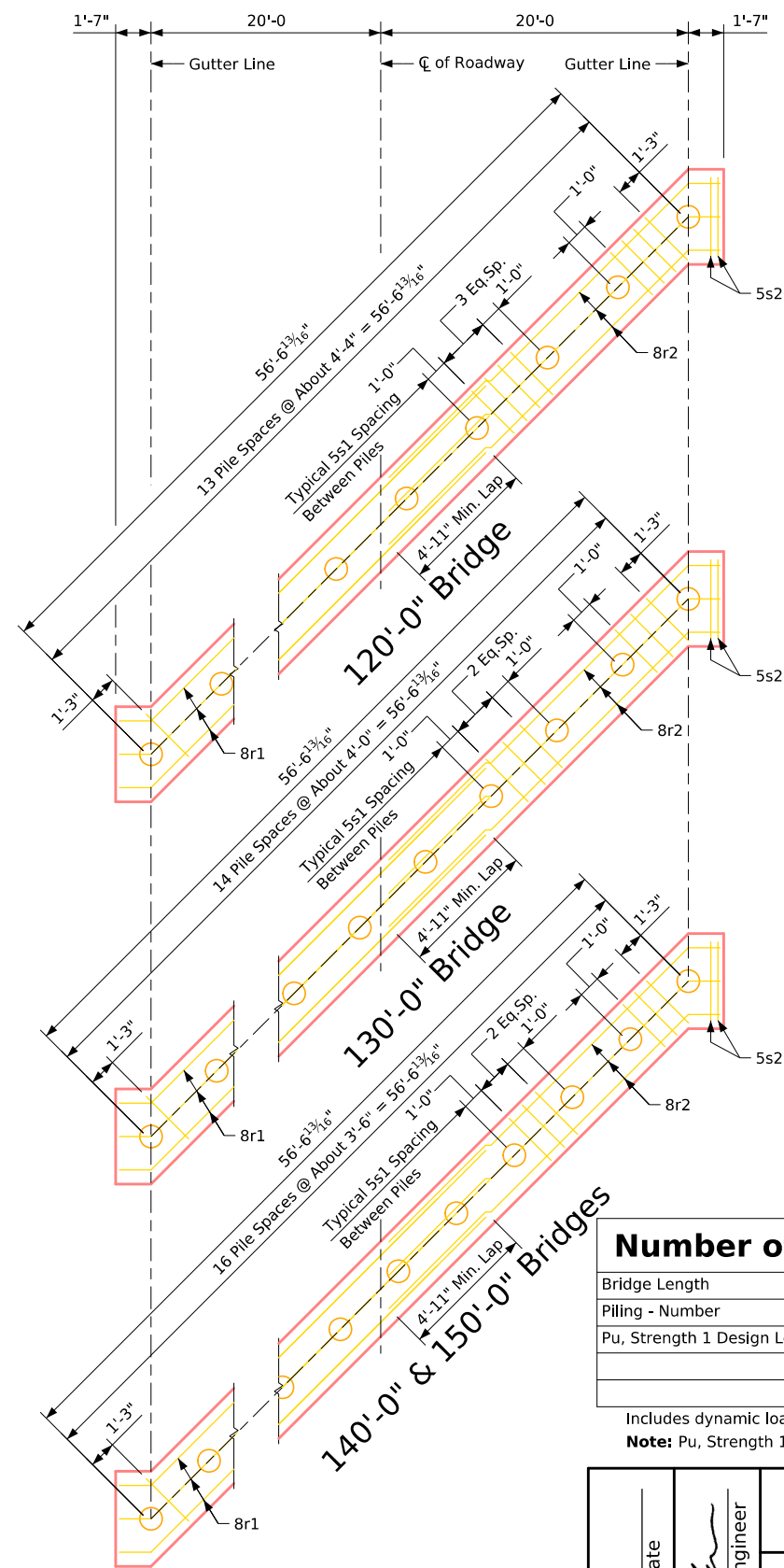
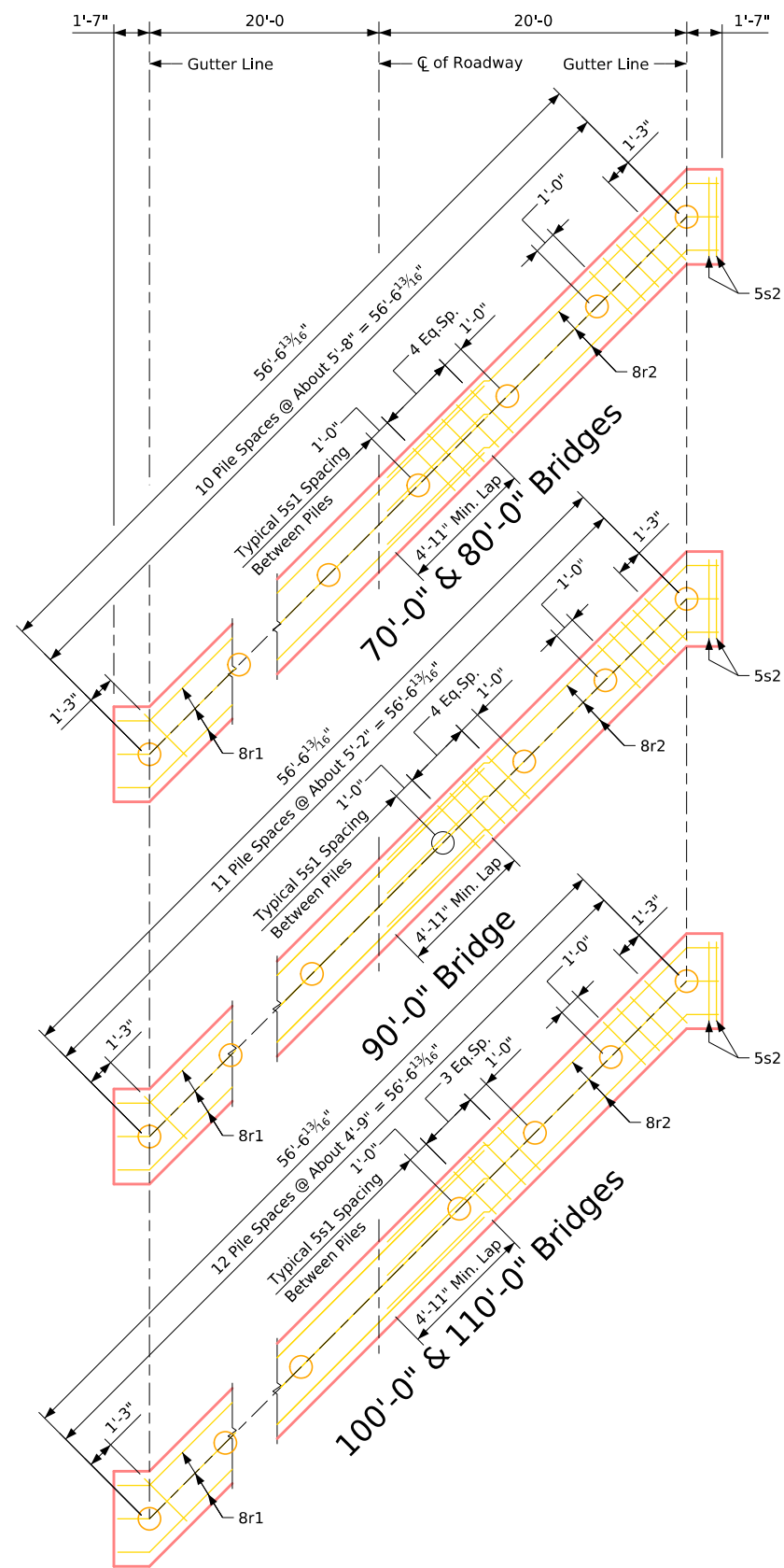
Continuous Concrete Slab Bridge

July, 2025

Abutment Details 30° Skew - Timber Piling (2 of 2)

J40-34-25





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	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.

Pile Plan - 45° Skew
Timber Piling

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)

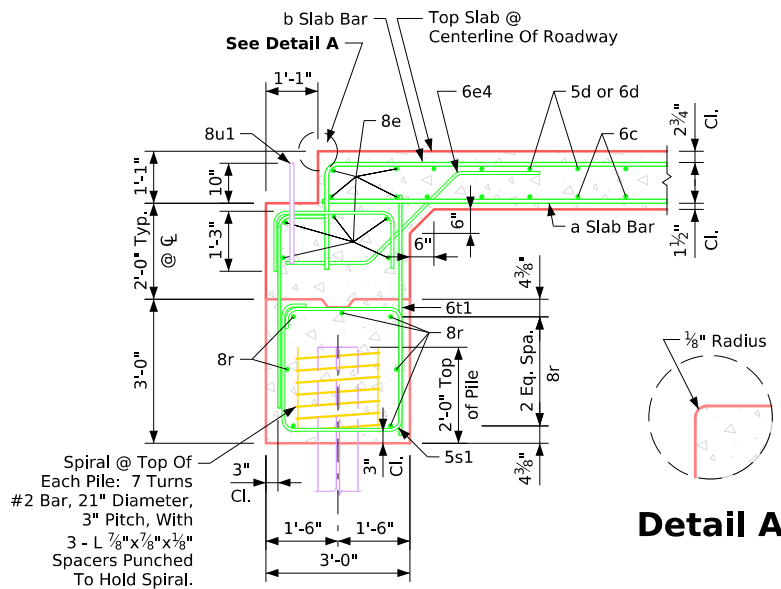
J40-36-25

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	No.	Weight	No.	Weight	No.	Weight	No.	Weight	
8r1	Abutment Footing Longitudinal		26'-4	7	492	7	492	7	492	7	492	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	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 7/8x7/8x1/8x 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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		27'-2	7	508	7	508	7	508	7	508	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	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 7/8x7/8x1/8x 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

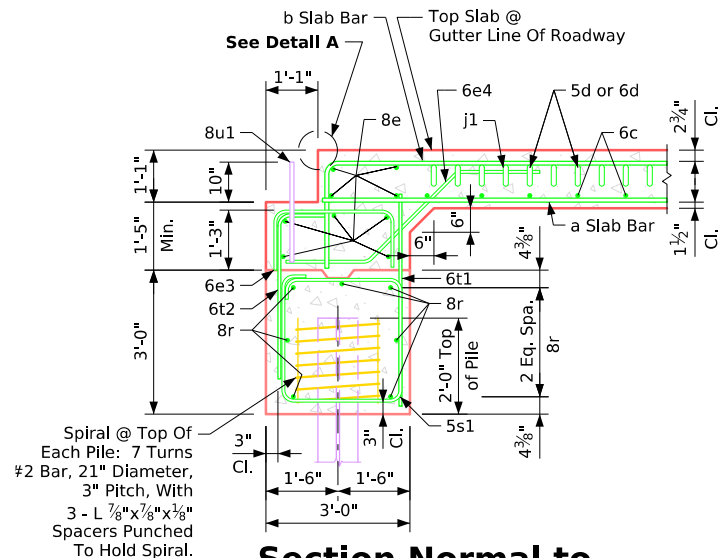
BILL OF REINFORCING STEEL - ONE ABUTMENT - 30°Skew																					
Bridge Length				70'-0		80'-0		90'-0		100'-0		110'-0		120'-0		130'-0		140'-0		150'-0	
Mark	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		29'-6	7	551	7	551	7	551	7	551	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	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 7/8x7/8x1/8x 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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		34'-8	7	648	7	648	7	648	7	648	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	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 7/8x7/8x1/8 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



Section Normal to Abutment @ CL

(Bridge Lengths 70-110ft)



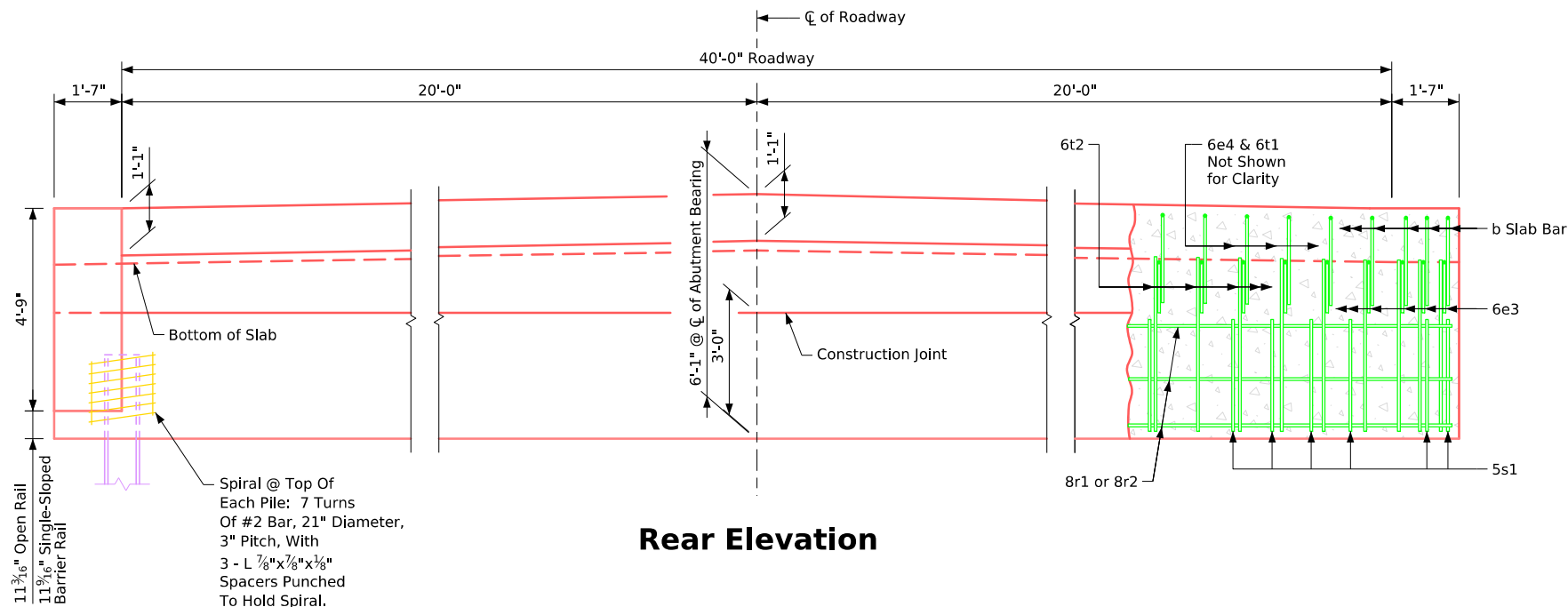
Section Normal to Abutment @ Gutter Line

ABUTMENT NOTES:

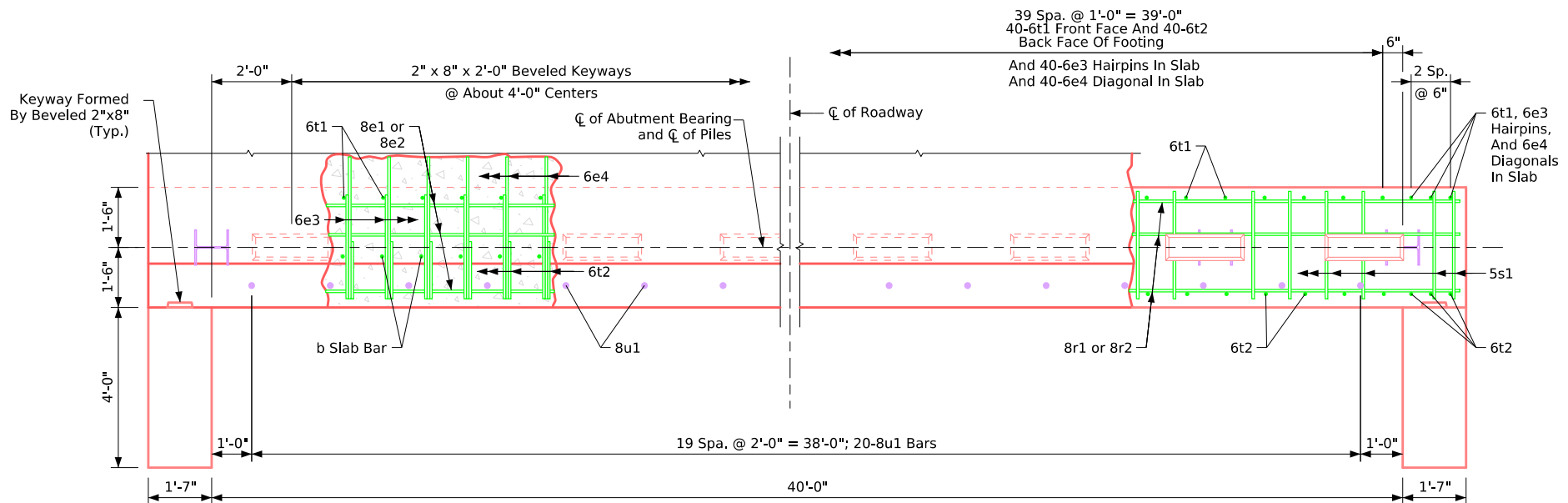
- All piling are HP 10x42.
- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet are to be used only when abutments are placed on steel piles. If rock is encountered closer than 12'-0" below the abutment footing, special analysis may be required.
- 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 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.

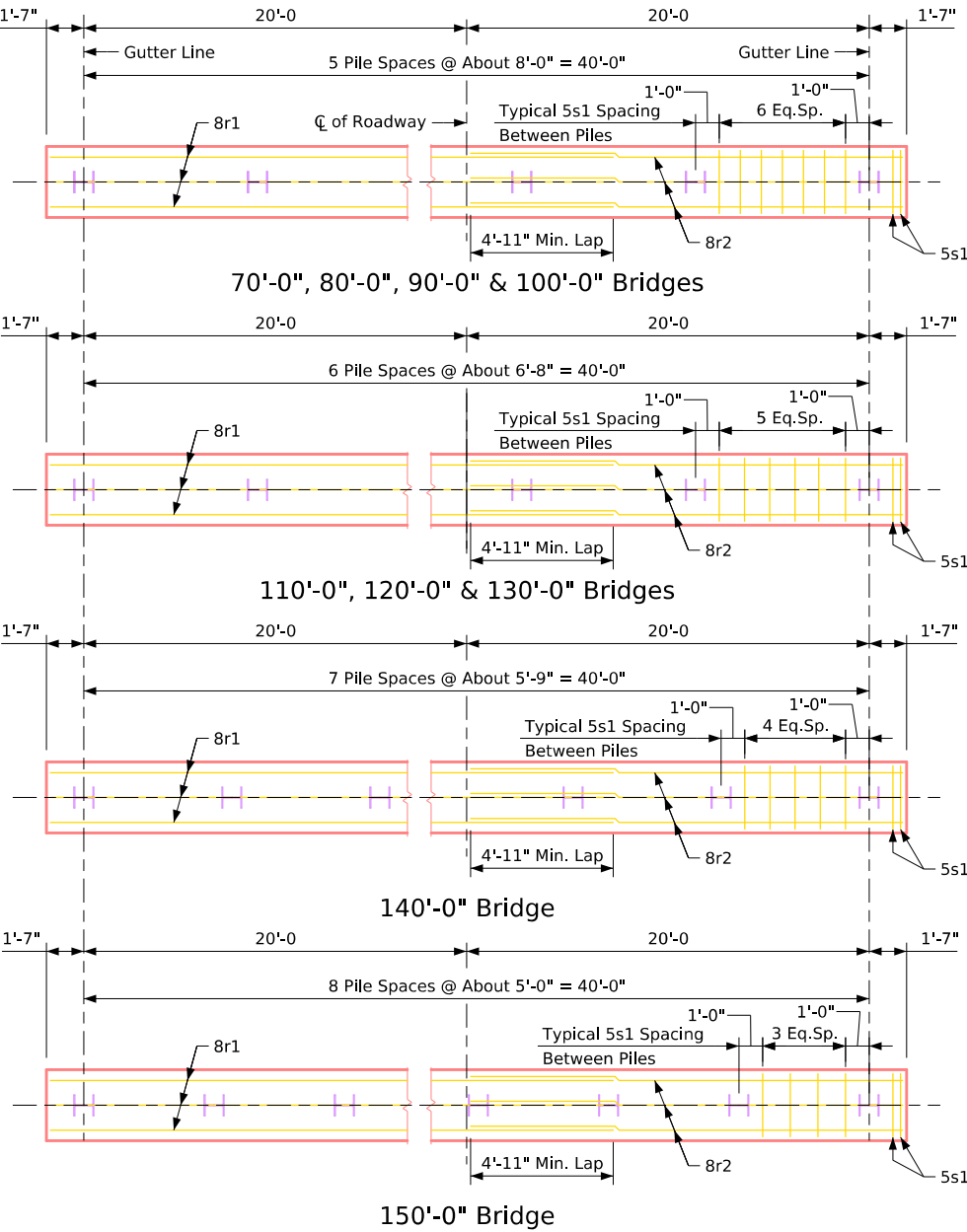


Rear Elevation



Plan View

Latest Revision Date		IOWA DOT	
	Approved by Bridge Engineer	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

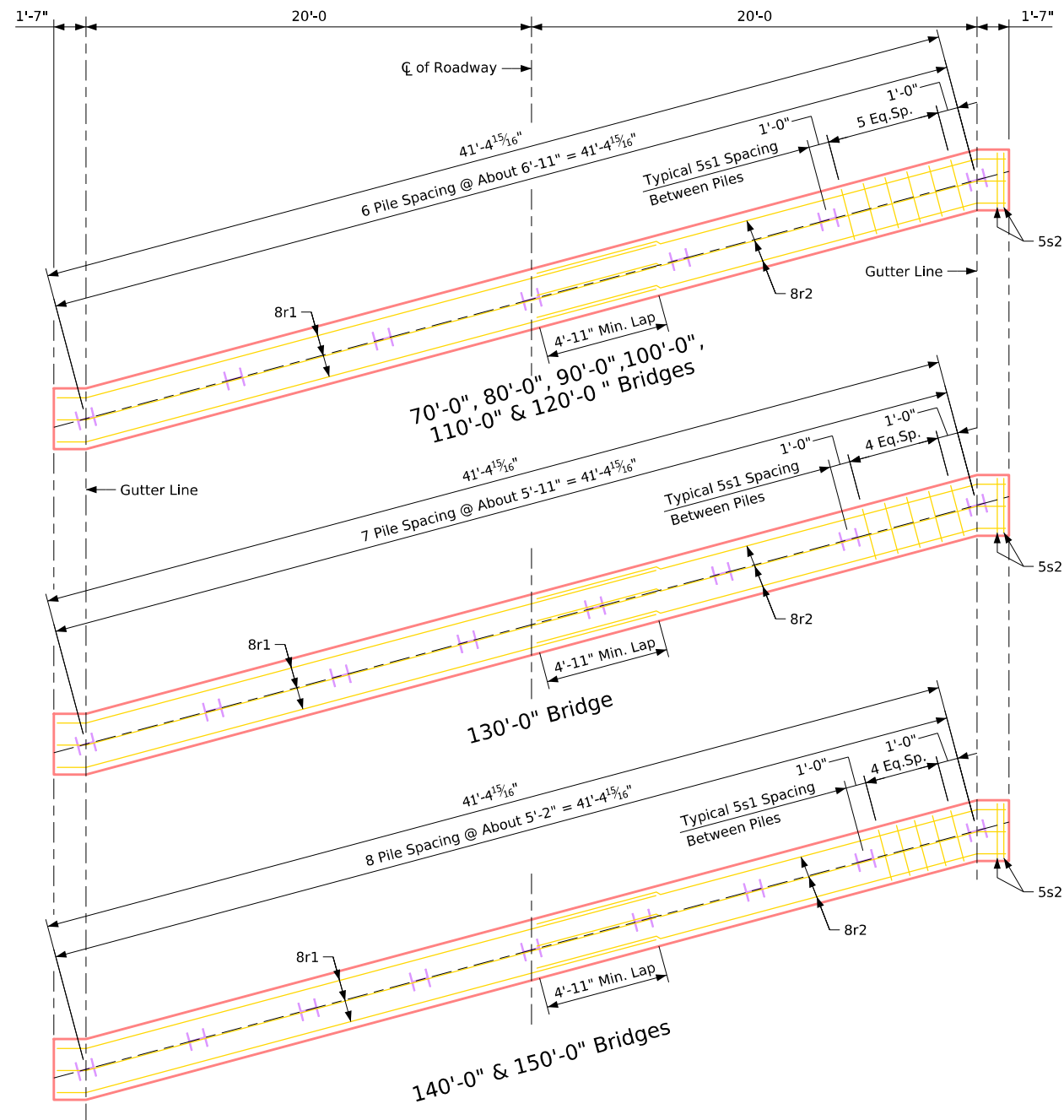
Δ Includes dynamic load allowance
Note: Pu, Strength 1 Design Load (kips) is not the value used in the field for driving piles.

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

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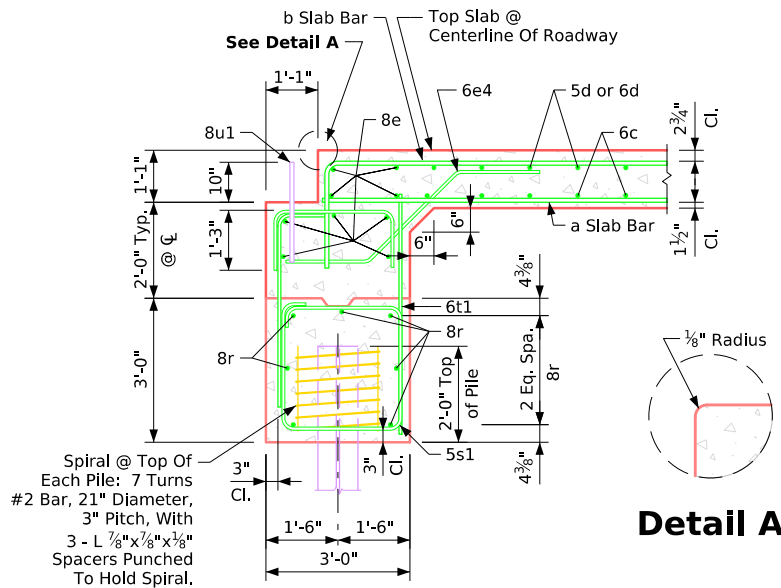
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

Abutment Details 15° Skew - Steel Piling (2 of 2)

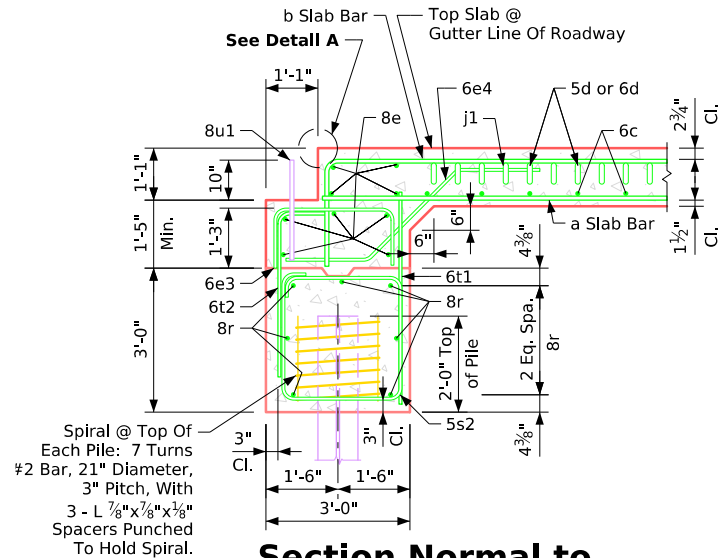
J40-41-25



Detail A

Section Normal to Abutment @ \mathcal{C}

(Bridge Lengths 70-110ft)



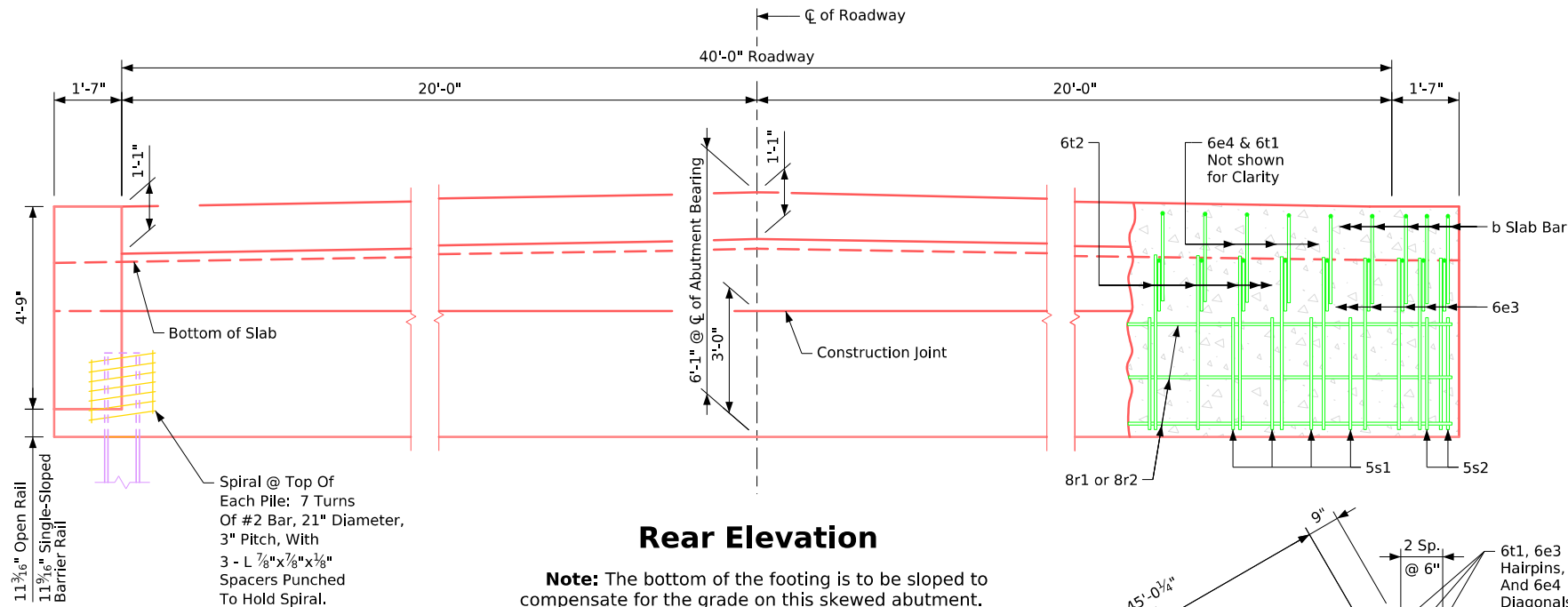
Section Normal to Abutment @ Gutter Line

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.

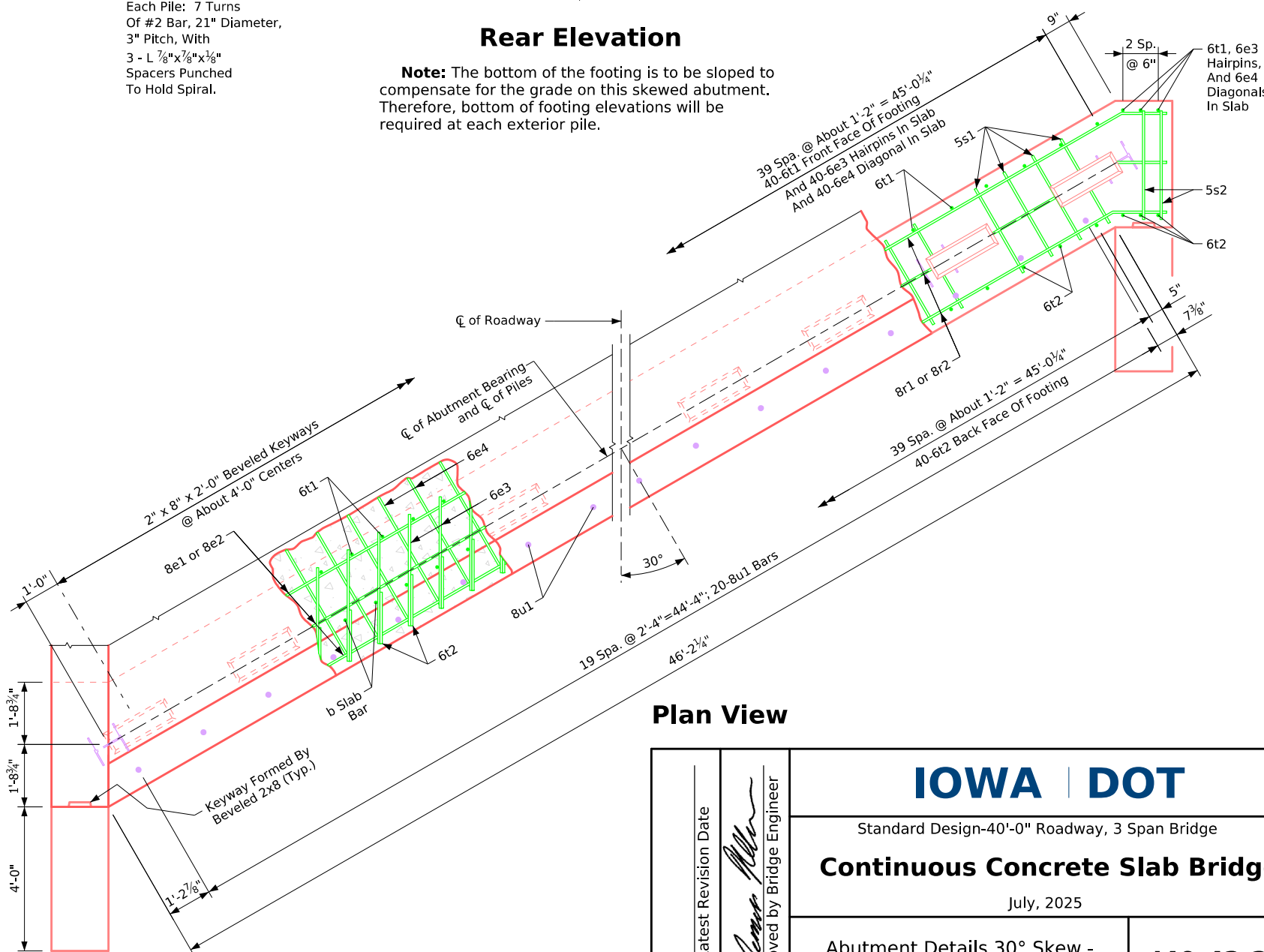
NOTES:

- Barrier rails and reinforcement not shown.
- Wing 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.



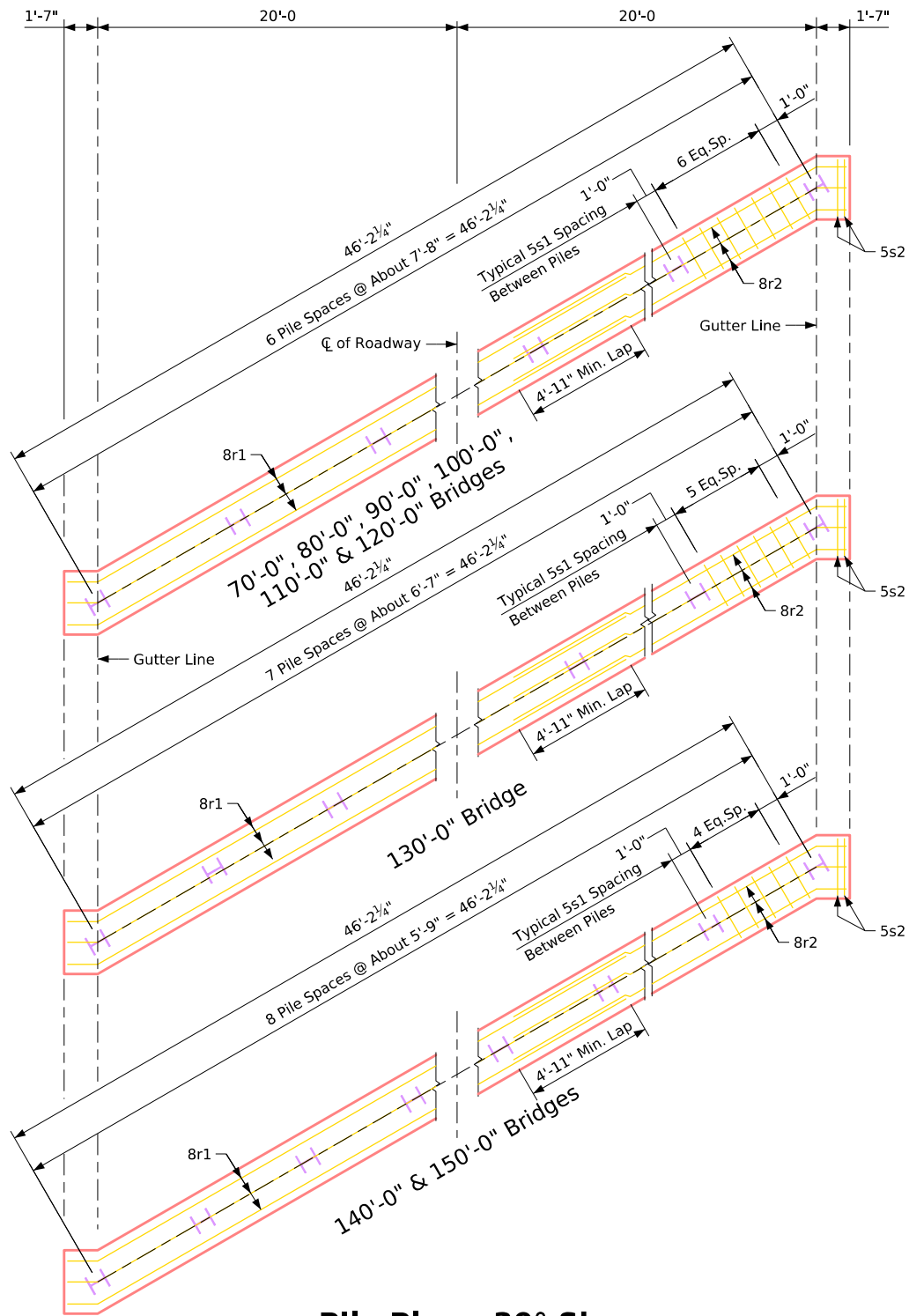
Rear Elevation

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	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer	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

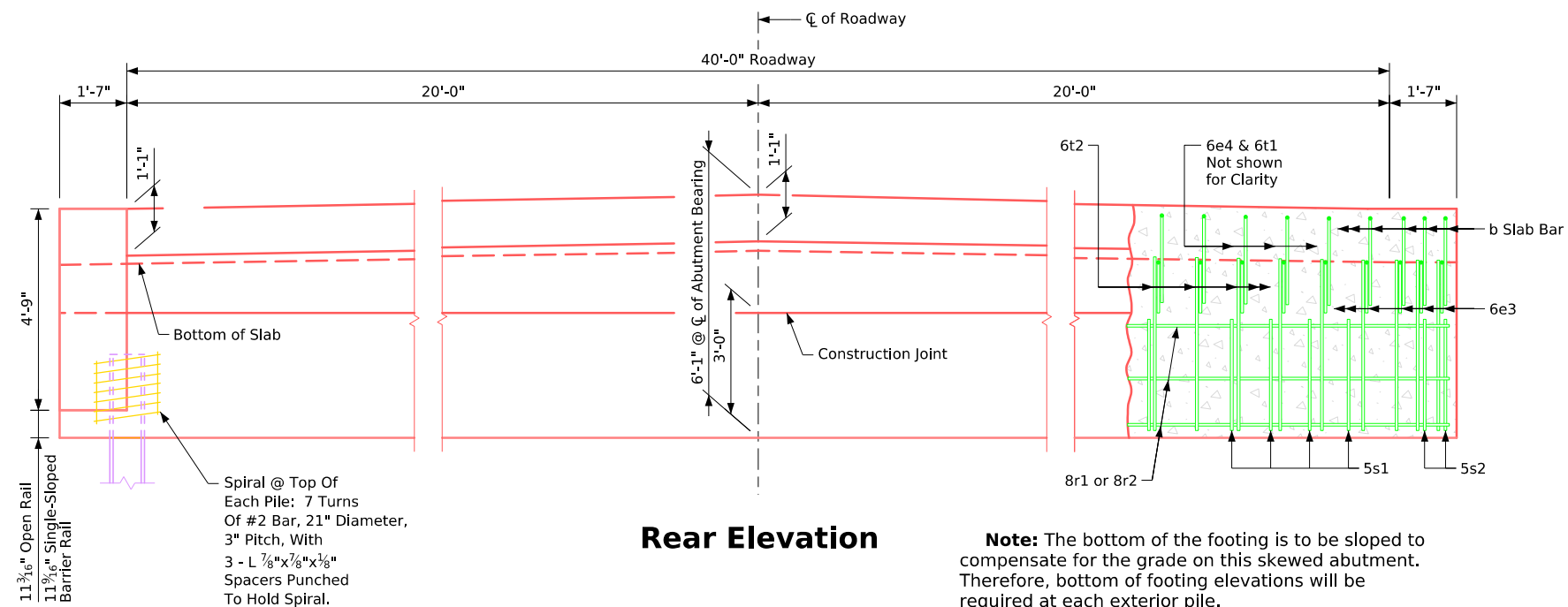
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

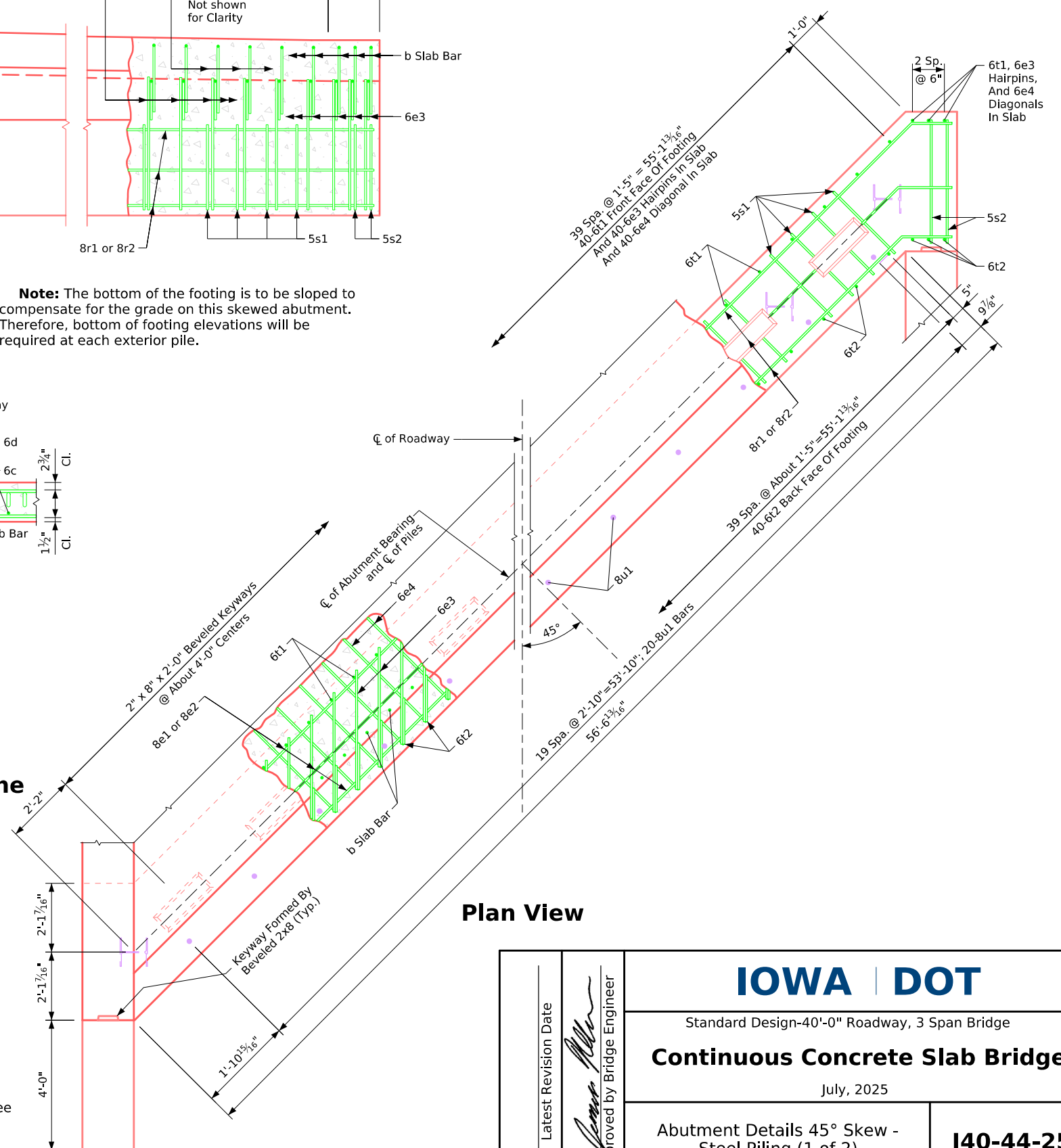
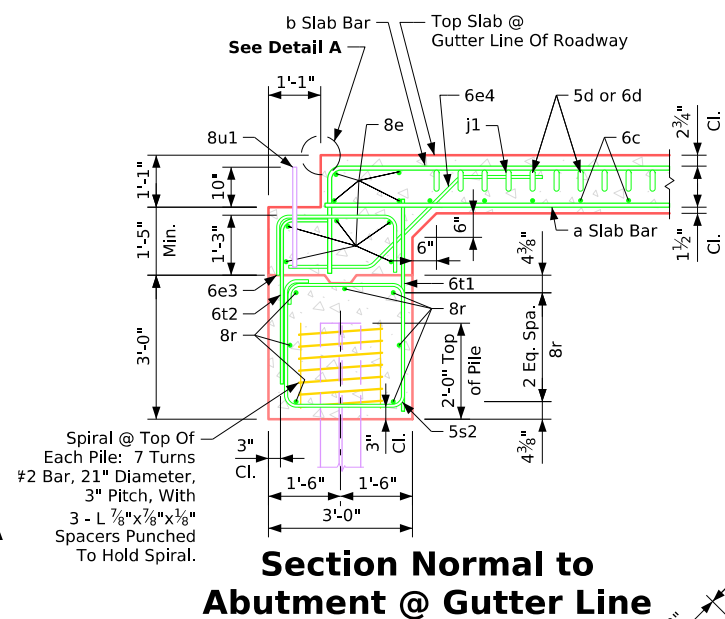
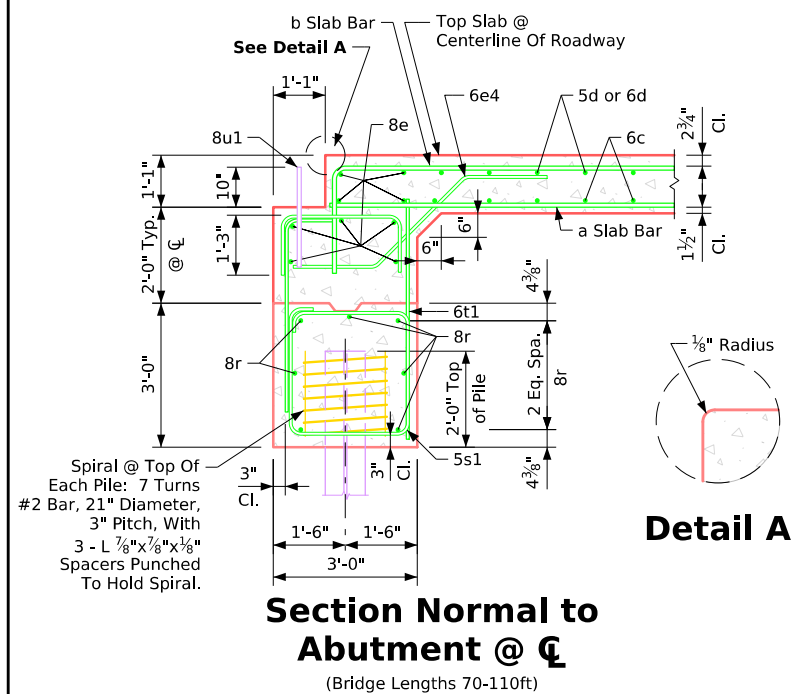
July, 2025

Abutment Details 30° Skew - Steel Piling (2 of 2)

J40-43-25



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.

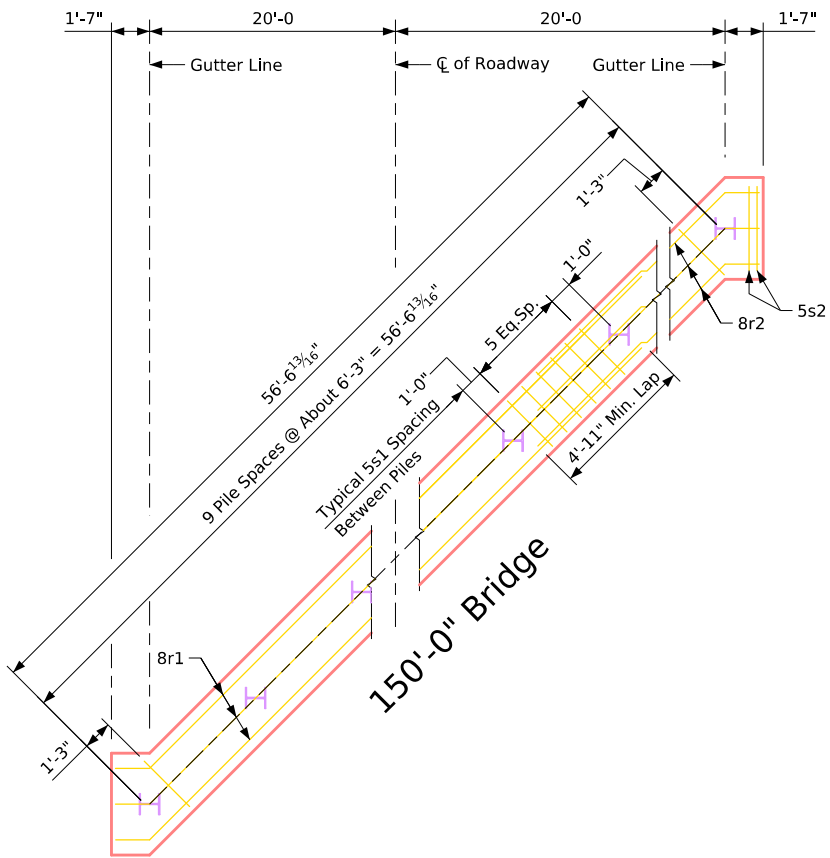
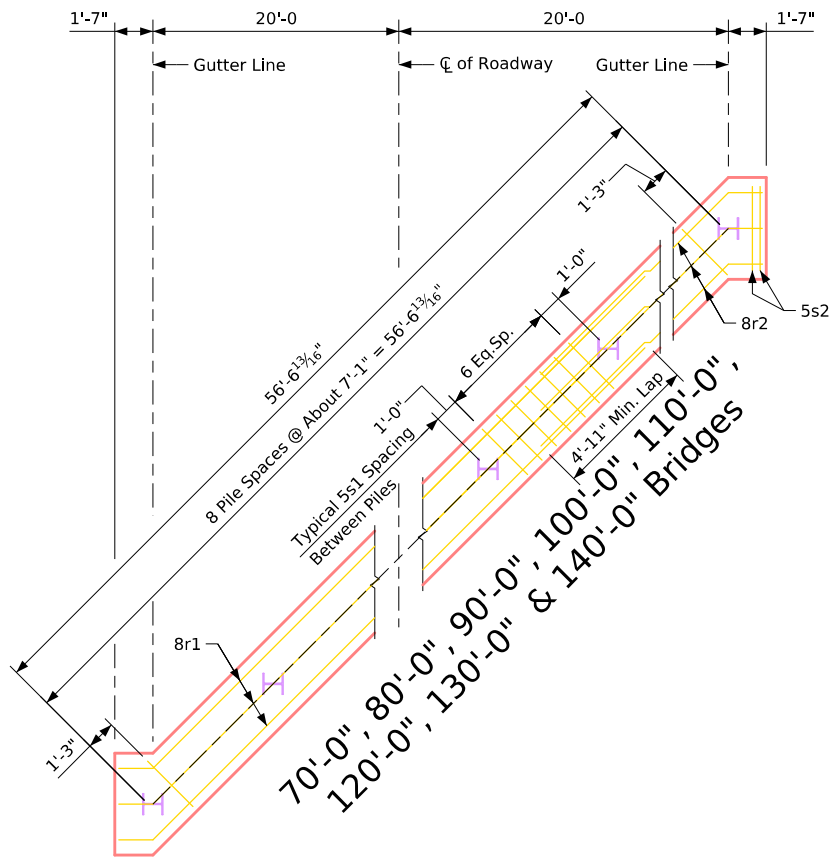


ABUTMENT NOTES:

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.
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 are included in the **Superstructure Quantities** for each individual bridge length.



Pile Plan 45° Skew
Steel Piling

Note: All piles are to be oriented
with the webs perpendicular to
the CL 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

Approved by Bridge Engineer

IOWA | DOT








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









Continuous Concrete Slab Bridge









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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		26'-4	7	492	7	492	7	492	7	492	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	7	399	7	399	7	399	7	399
5s1	Abutment Footing Hoops		11'-0	39	447	39	447	39	447	39	447	40	459	40	459	40	459	39	447	36	413
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	6	39	6	39	6	39	6	39	7	45	7	45	7	45	8	51	9	58
	Spiral Spacers - L 7/8x7/8x1/8x 0.70		1'-10	18	24	18	24	18	24	18	24	21	27	21	27	21	27	24	31	27	35
Reinforcing steel epoxy coated - total (lbs.)					2132		2132		2132		2132		2153		2153		2153		2151		2128

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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		27'-2	7	508	7	508	7	508	7	508	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	7	413	7	413	7	413	7	413
5s1	Abutment Footing Hoops		11'-0	36	413	36	413	36	413	36	413	36	413	36	413	35	402	40	459	40	459
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	7	45	7	45	7	45	7	45	7	45	7	45	8	52	9	58	9	58
	Spiral Spacers - L 7/8x7/8x1/8x 0.70		1'-10	21	28	21	28	21	28	21	28	21	27	21	27	24	31	27	35	27	35
Reinforcing steel epoxy coated - total (lbs.)					2184		2184		2184		2184		2184		2184		2183		2251		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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		29'-6	7	551	7	551	7	551	7	551	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	7	456	7	456	7	456	7	456
5s1	Abutment Footing Hoops		11'-0	42	482	42	482	42	482	42	482	42	482	42	482	42	482	40	459	40	459
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	7	45	7	45	7	45	7	45	7	45	7	45	8	52	9	58	9	58
	Spiral Spacers - L 7/8x7/8x1/8x 0.70		1'-10	21	27	21	27	21	27	21	28	21	28	21	27	24	31	27	35	27	35
Reinforcing steel epoxy coated - total (lbs.)					2342		2342		2342		2342		2342		2342		2352		2340		2340

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	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		34'-8	7	648	7	648	7	648	7	648	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	7	553	7	553	7	553	7	553
5s1	Abutment Footing Hoops		11'-0	56	642	56	642	56	642	56	642	56	642	56	642	56	642	56	642	54	620
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	9	58	9	58	9	58	9	58	9	58	9	58	9	58	9	58	10	64
	Spiral Spacers - L 7/8x7/8x1/8x 0.70		1'-10	27	35	27	35	27	35	27	35	27	35	27	35	27	35	27	35	30	39
Reinforcing steel epoxy coated - total (lbs.)					2723		2723		2723		2723		2723		2723		2723		2723		2711

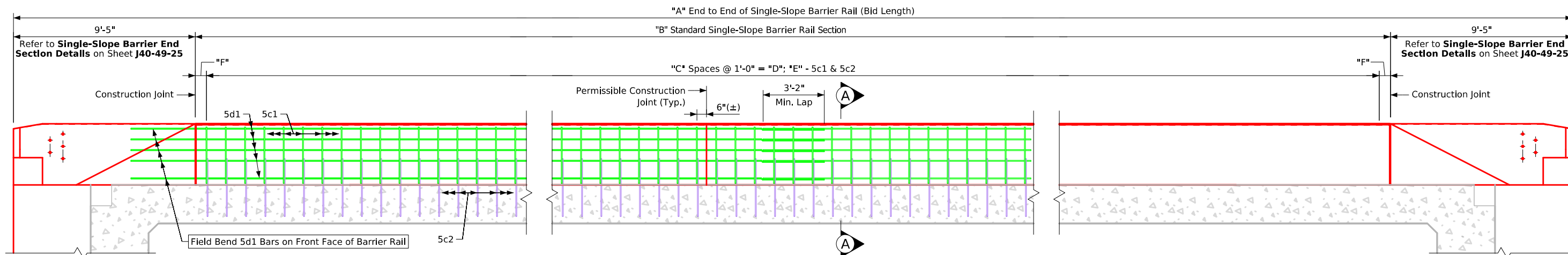
Note: The pile spirals and spiral spacers are to be non-coated reinforcing but may be epoxy-coated at the contractor's option and expense.

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

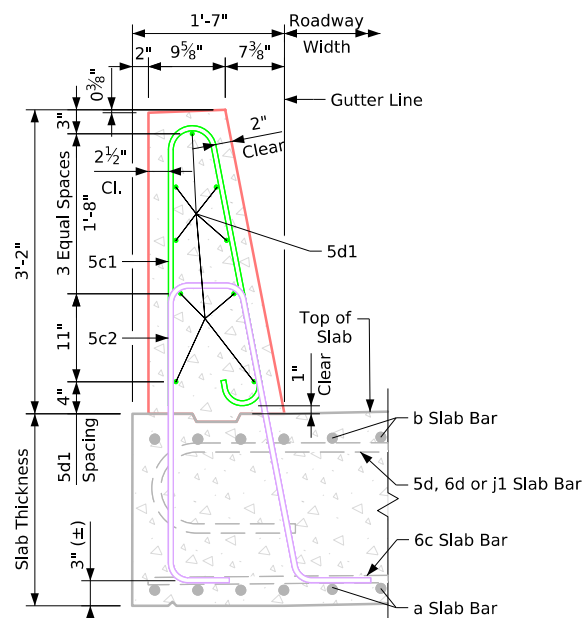
ESTIMATED QUANTITIES - ONE ABUT. - 15°Skew											
Location		Unit	Quantity								
Bridge Length			70'-0	80'-0	90'-0	100'-0	110'-0	120'-0	130'-0	140'-0	150'-0
Structural Concrete (Bridge)		c.y.	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9
Reinforcing Steel, Epoxy-Coated		lbs.	2184	2184	2184	2184	2184	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

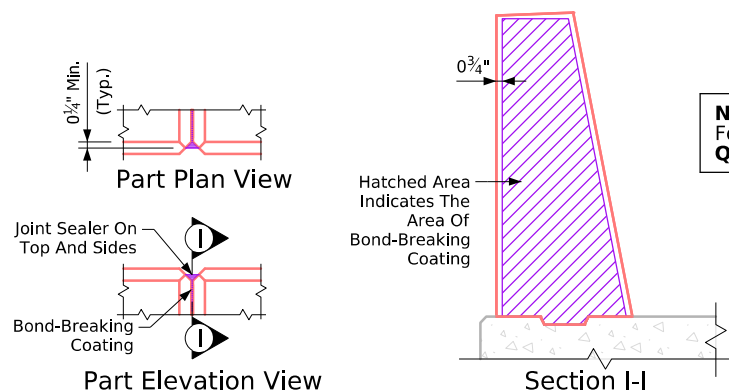
Table of Single-Slope Barrier Rail Dimensions and Numbers

[illegible]

Elevation of Single-Sloped Barrier Rail



Part Section A-A



Barrier Rail Joint Details

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

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.

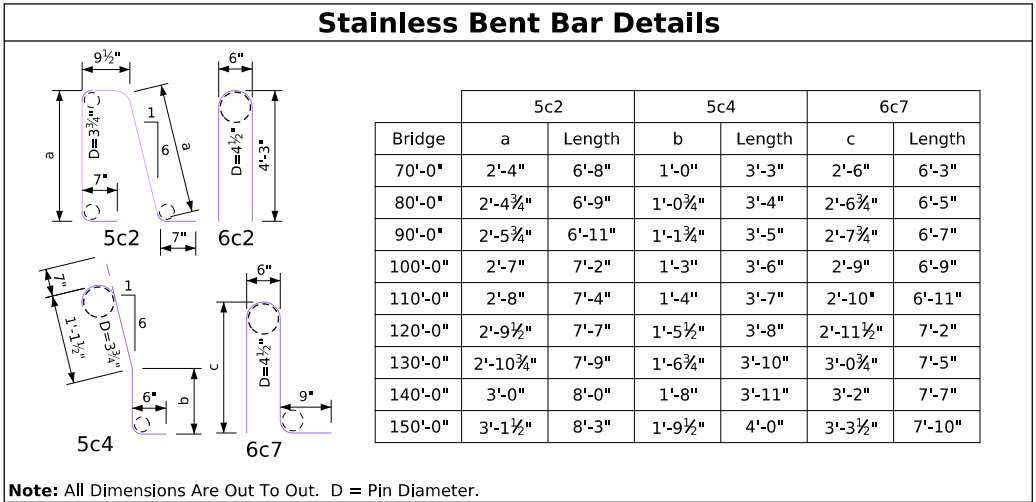
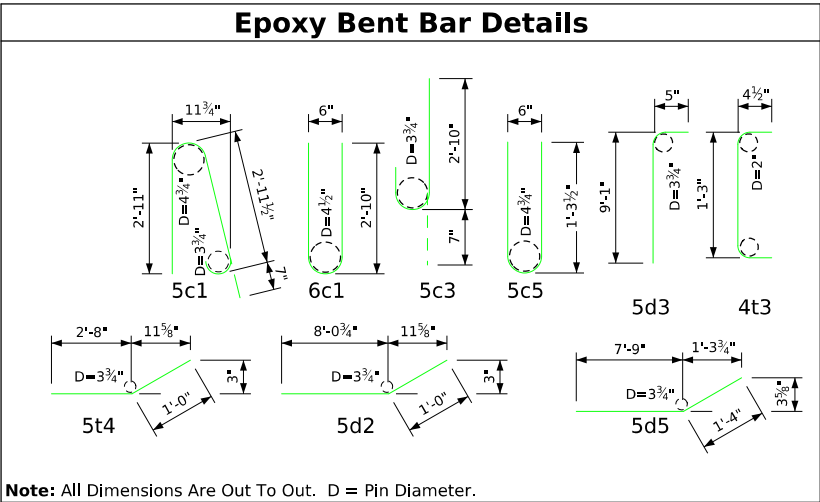
All Single-sloped barrier rail reinforcing steel is to be either epoxy coated or stainless steel as shown or noted. The stainless steel reinforcing steel shall be deformed bar Grade 60 meeting the requirements of **Materials I.M.452.**

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).

Latest Revision Date  Approved by Bridge Engineer	<h1>IOWA DOT</h1>	
	Standard Design-40'-0" Roadway, 3 Span Bridge <h2>Continuous Concrete Slab Bridge</h2>	
	July, 2025	<h2>J40-47-25</h2>

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		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




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

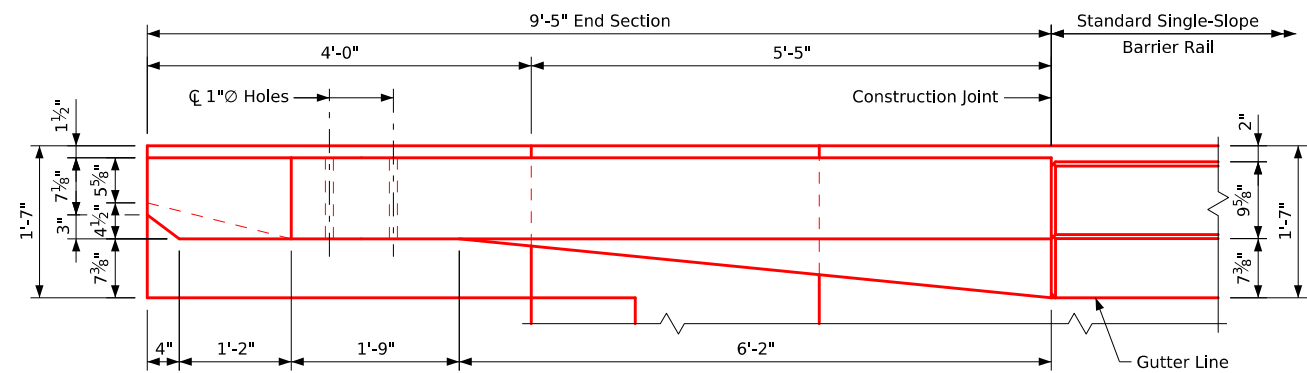
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

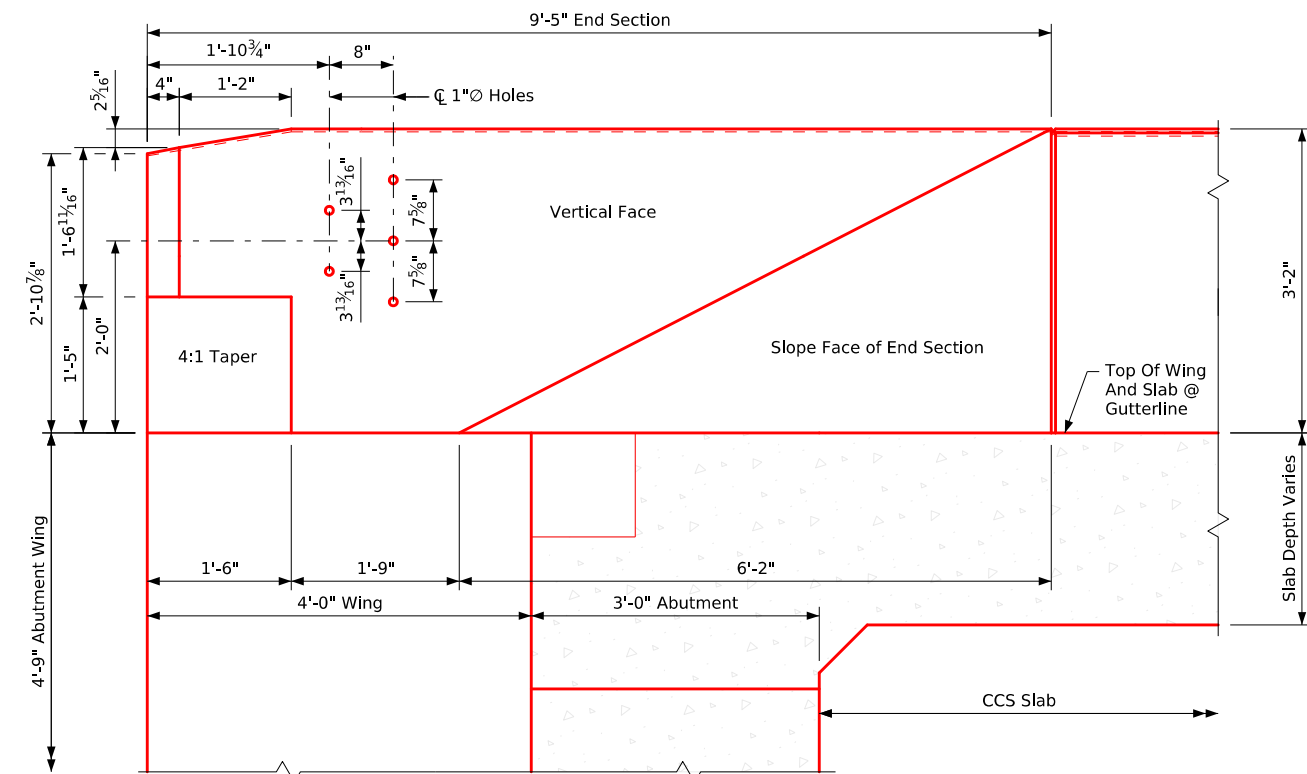
Rail Single-Slope Barrier – Quantities

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**.



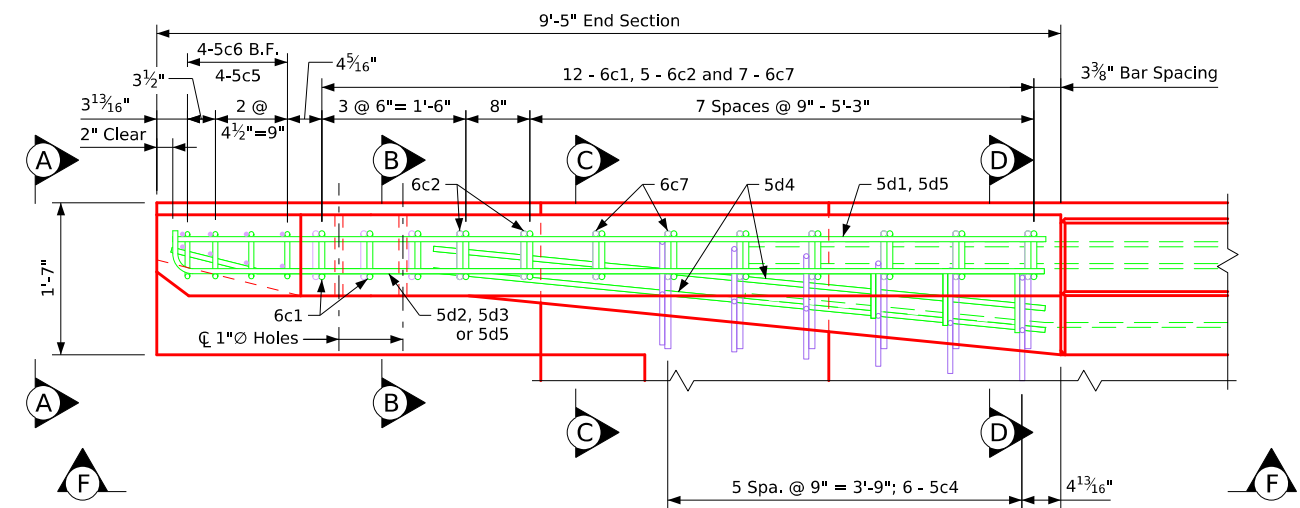
Part Elevation View

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.

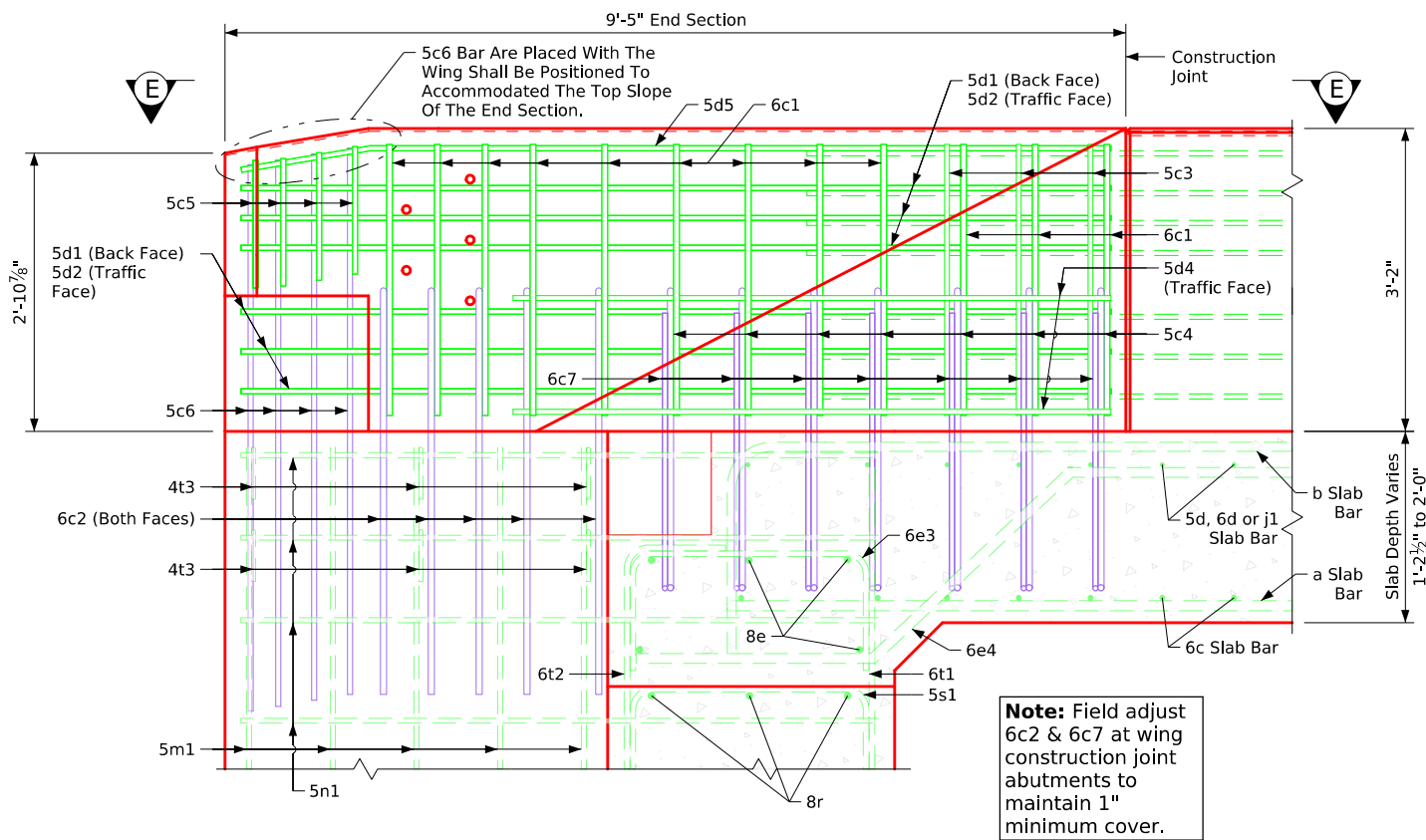
Construction joint between the top of the abutment wing and the single-slope barrier rail is roughened concrete.

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

Latest Revision Date

Approved by Bridge Engineer

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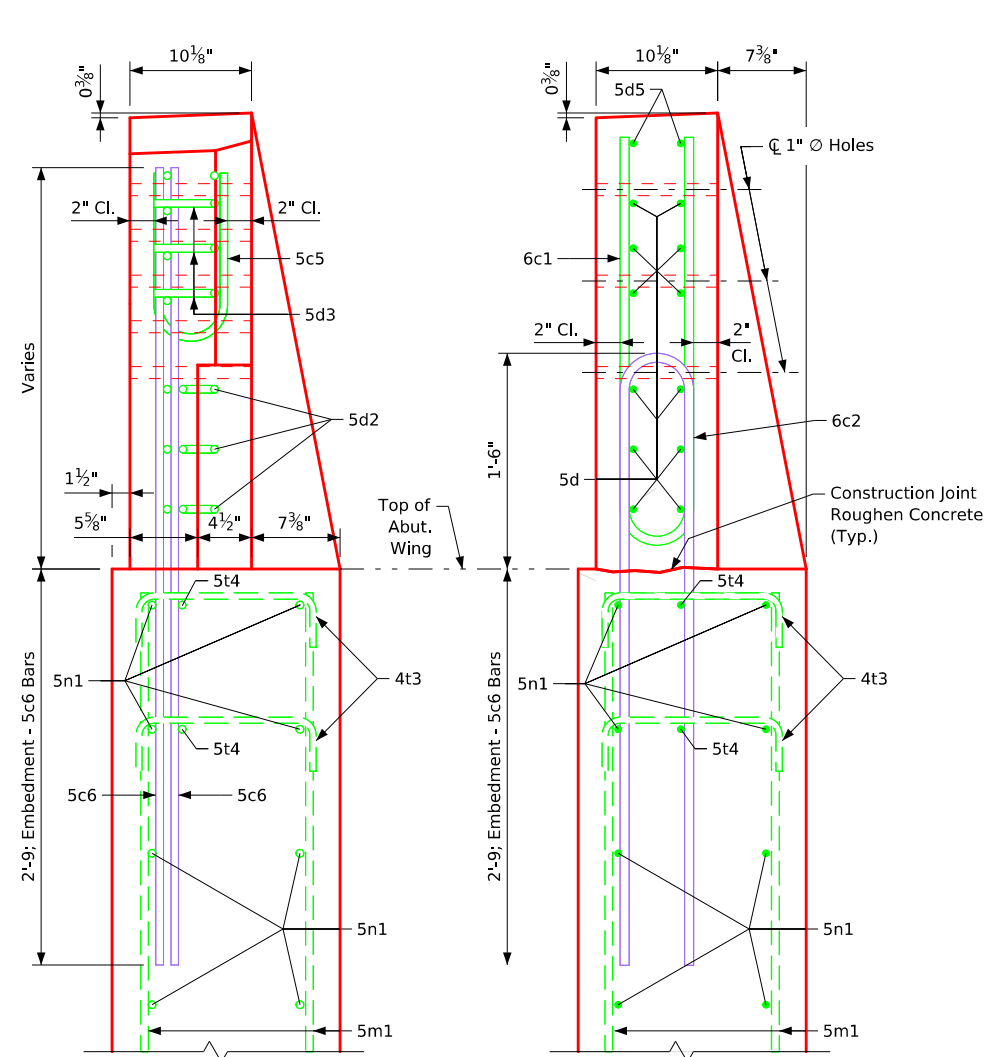
Standard Design-40'-0" Roadway, 3 Span Bridge

Continuous Concrete Slab Bridge

July, 2025

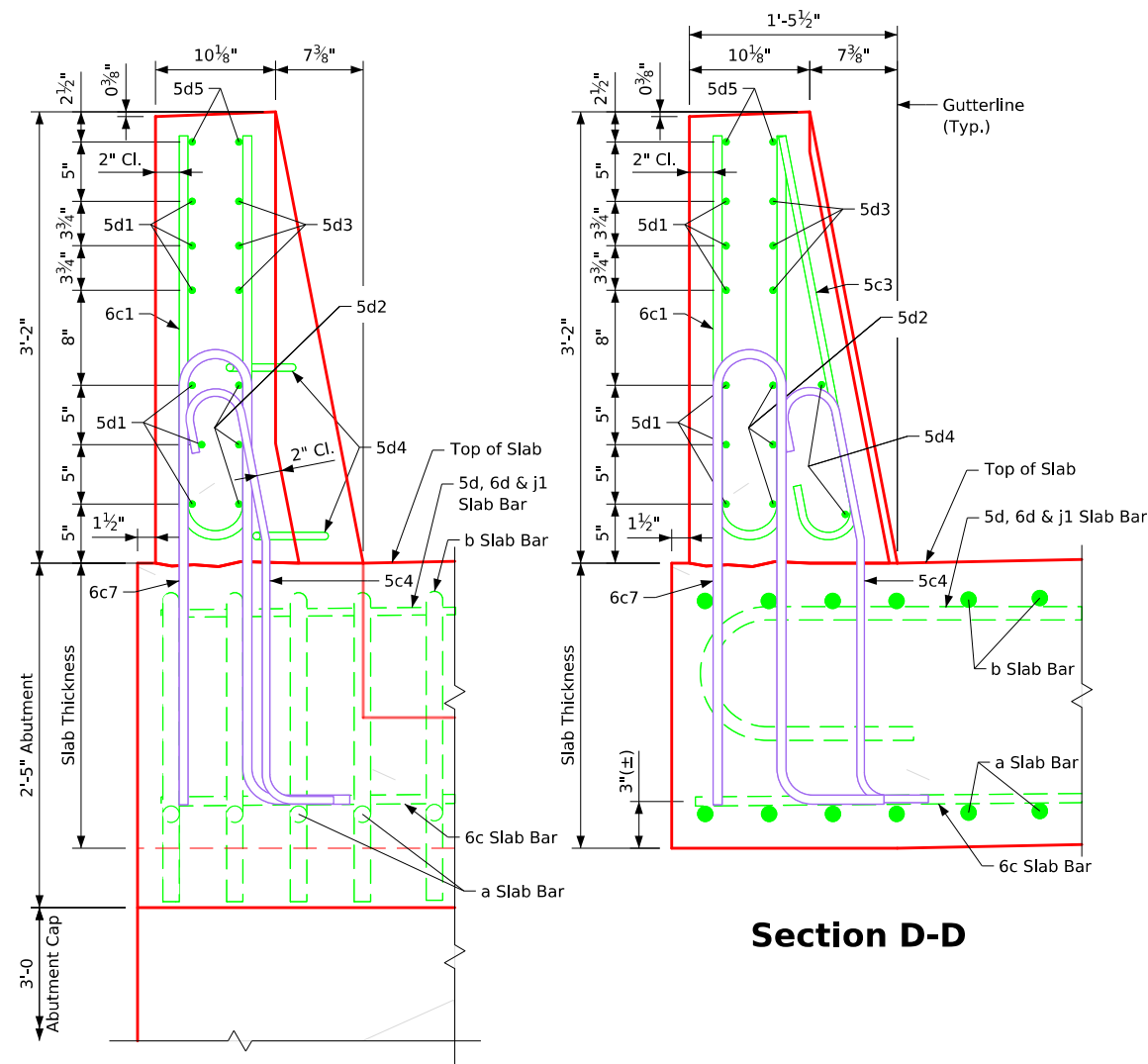
Rail Single-Slope
Barrier - End Section
Details (1 of 2)

J40-49-25



View A-A

Section B-B



Section D-D

Section C-C

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**.


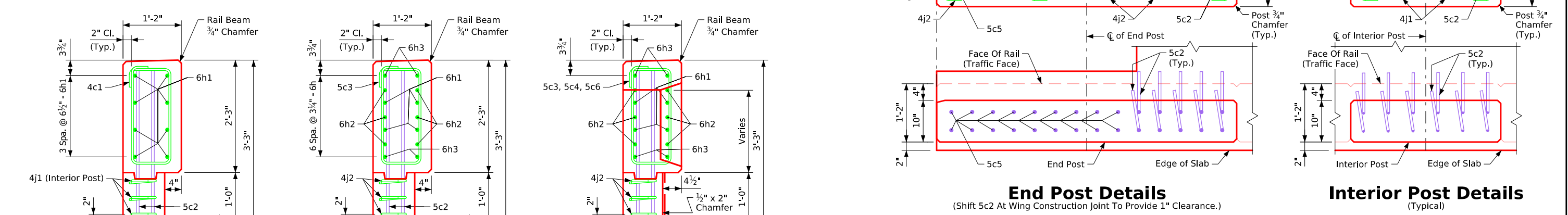
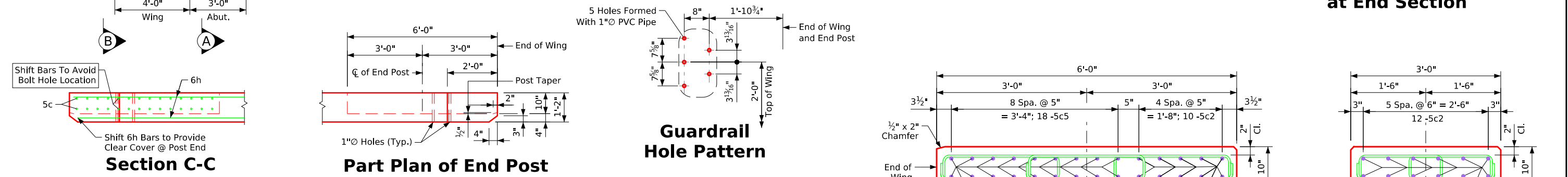
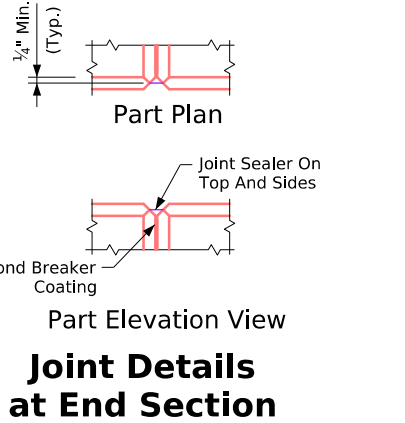
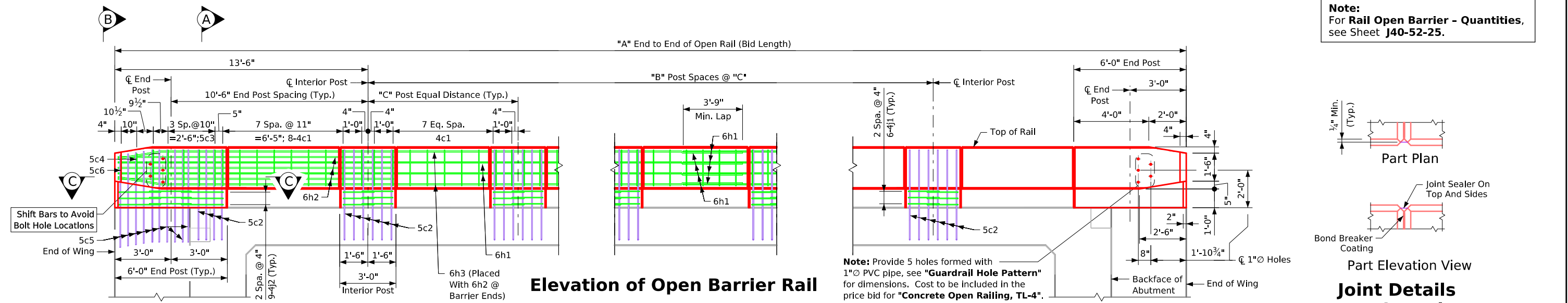
Latest Revision Date		IOWA DOT	
	Approved by Bridge Engineer	Standard Design-40'-0" Roadway, 3 Span Bridge Continuous Concrete Slab Bridge July, 2025	
		Rail Single-Slope Barrier - End Section Details (2 of 2)	J40-50-25

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"			
Dim. or Number	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	0	15	30	45
	A(ft.-in.)	81'-0"	81'-1¼"	81'-5½"	82'-3"	91'-0"	91'-1¼"	91'-5½"	92'-3"	101'-0"	101'-1¼"	101'-5½"	102'-3"	111'-0"	111'-1¼"	111'-5½"	112'-3"	121'-0"	121'-1¼"	121'-5½"	122'-3"	131'-0"	131'-1¼"	131'-5½"	132'-3"	141'-0"	141'-1¼"	141'-5½"	142'-3"	151'-0"	151'-1¼"	151'-5½"	152'-3"	161'-0"	161'-1¼"	161'-5½"	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'-8¾"	7'-8¾"	7'-9¾"	7'-10¾"	8'-0"	8'-0¾"	8'-0¾"	8'-1¼"	8'-2¾"	8'-2¾"	8'-3¼"	8'-4¾"	8'-4¾"	8'-4¾"	8'-5¾"	8'-6¼"	8'-6½"	8'-6¾"	8'-7"	8'-7¾"	8'-8"	8'-8¾"	8'-8¾"	8'-9¼"	8'-9¾"	8'-9¾"	8'-10¾"	8'-10¾"	8'-10¾"	8'-11¾"	8'-11¾"	8'-11¾"	8'-11¾"	8'-11¾"	8'-5¾"

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



Rail Chamfer Detail

This diagram shows the rail chamfer detail, including the 1/4" chamfer on the rail top and sides, the 1/2" x 2" chamfer, and the 1'-0" dimensions. The diagram also shows the 2" dimensions and the 1'-0" dimensions.

Latest Revision Date

Approved by Bridge Engineer

[Signature]

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	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.

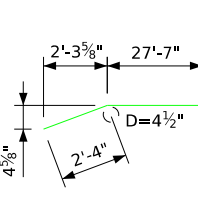
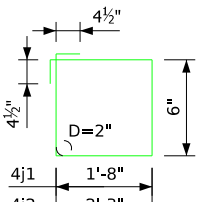
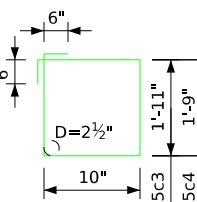
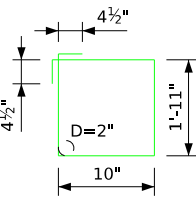
Stainless Steel Reinforcing Steel - Two Barrier Rails																													
Bridge Length			70'-0"			80'-0"			90'-0"			100'-0"			110'-0"			120'-0"			130'-0"			140'-0"			150'-0"		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	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 Quantites											
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	

Epoxy Bent Bar Details



4c1

5c3, 5c4
& 5c6

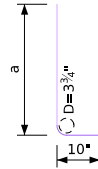
4j1 & 4j2

6h3

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

Stainless Bent Bar Details

Bridge	Slab Depth	a Dim.	Bar Length
70'-0"	1'-2 1/2"	4'-1"	4'-11"
80'-0"	1'-3 1/4"	4'-1 3/4"	5'-0"
90'-0"	1'-4 1/4"	4'-2 3/4"	5'-1"
100'-0"	1'-5 1/2"	4'-4"	5'-2"
110'-0"	1'-6 1/2"	4'-5"	5'-3"
120'-0"	1'-8"	4'-6 1/2"	5'-5"
130'-0"	1'-9 1/4"	4'-7 3/4"	5'-6"
140'-0"	1'-10 1/2"	4'-9"	5'-7"
150'-0"	2'-0"	4'-10 1/2"	5'-9"



5c2

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

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

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 \mathcal{C} grade.

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 -
Quantities

J40-52-25

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.

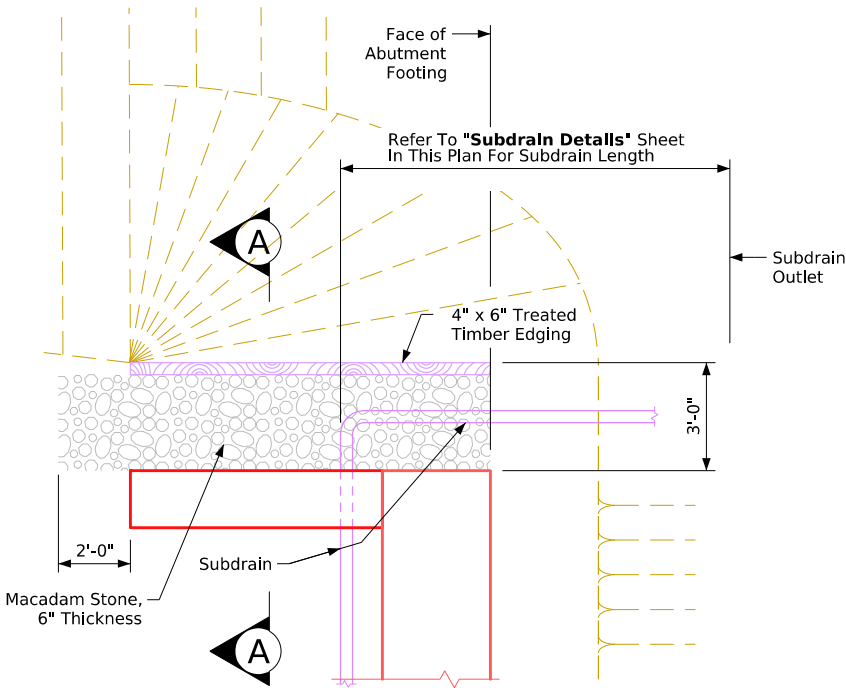
Subdrain Notes:

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

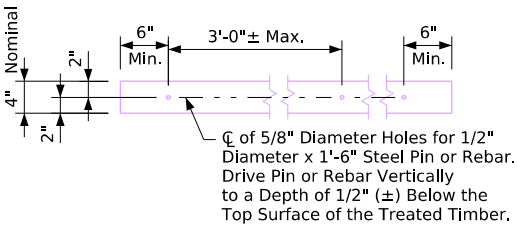
The Bridge Contractor is responsible for installing subdrains behind the abutment. The subdrains shall be 4" in diameter and comply with **Article 4143.01, B, of the Standard Specifications**. The subdrain outlet shall consist of a 6'-0" length of pipe with a removable rodent guard.

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.

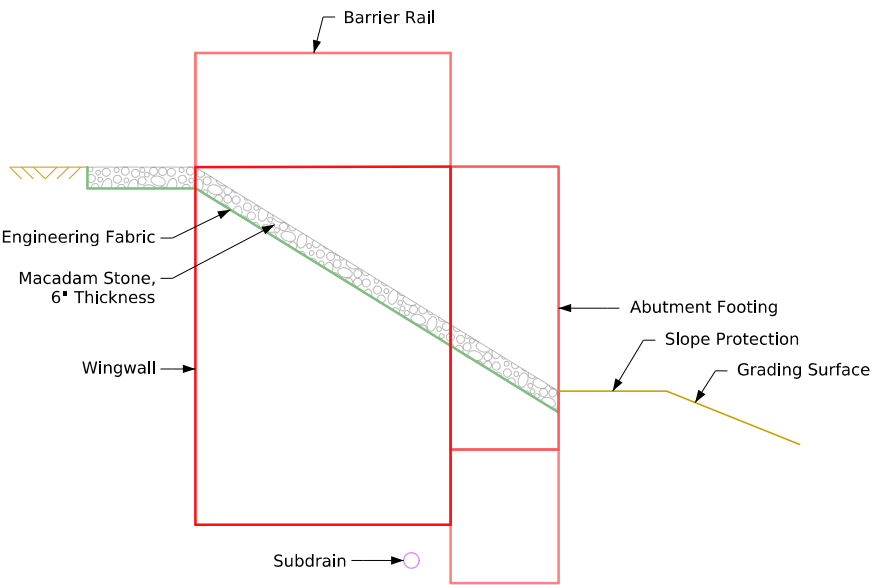
The cost for furnishing and placing the subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for **"Structural Concrete (Bridge)"**. No additional payment will be made.



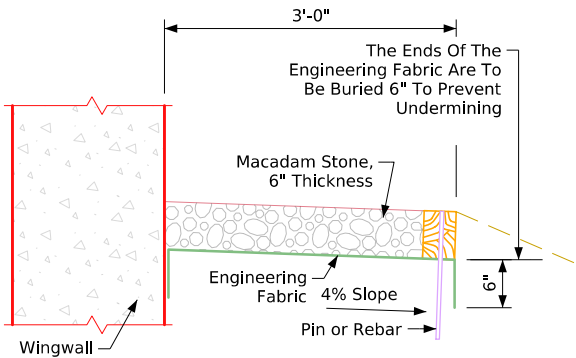
Plan View of Wing Armoring




4" x 6" Treated Timber Edging Details



Elevation View of Wing Armoring



Section A-A

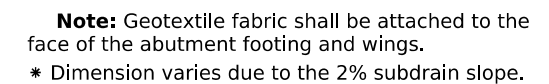
Latest Revision Date	IOWA DOT	
	Standard Design-40'-0" Roadway, 3 Span Bridge	
	Continuous Concrete Slab Bridge	
Approved by Bridge Engineer 	July, 2025	
	Wing Protection & Macadam Stone Details	J40-54-25



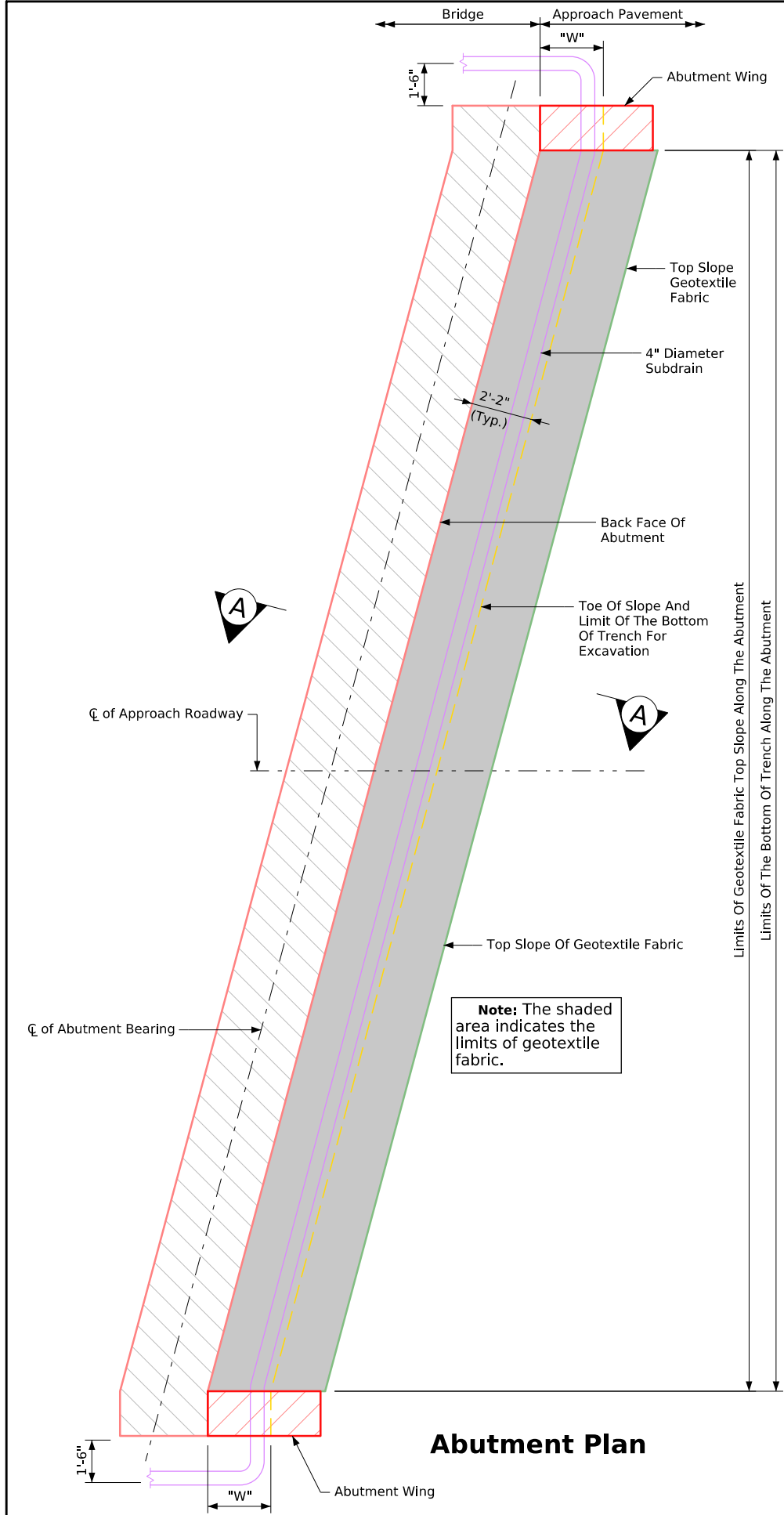
Subdrain shall slope downward 2% from centerline approach roadway when outletting both sides of the abutment.

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.



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



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.

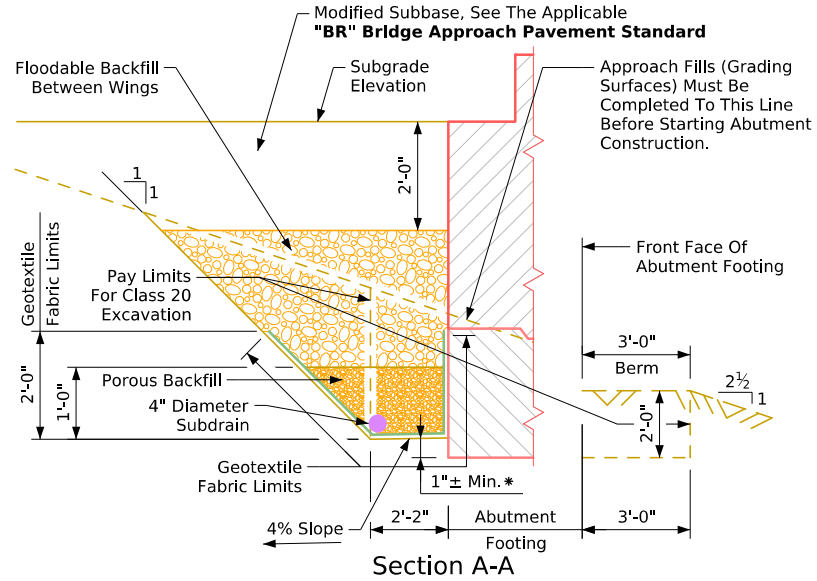
Water used for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric at the bridge abutments will not be measured separately for payment. The cost of this water shall be included in the contract unit price bid for **"Structural Concrete (Bridge)"**.

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 $\frac{1}{2}$ "
30 Degree	2'-6"
45 Degree	3'-0 $\frac{3}{4}$ "

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

Latest Revision Date



Approved by Bridge Engineer

IOWA | DOT

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

Continuous Concrete Slab Bridge

July, 2025

Backfill Details - 15°, 30°, 45° Skew Abutments

J40-56-25