

Index of Sheets	
No.	Description
A Sheets	Bridge Plan
A.1	Title Sheet
A.2	Location Map Sheet
V Sheets	Bridge Plan
V.1	Estimated Quantities - Design 126
V.2 - V.34	Design 126
SPS Sheets	Bridge Plan Soils Sheet
SPS.1 - SPS.3	Bridge Plan Soils Sheet
Road Sheets	Road Plan
A.3 - W.23	Road Plans
C.1 - C.3	Estimated Quantities - Road
C.15	Standard Plans - Road
MWM.4	Estimated Quantities - Water Main



PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM MONTGOMERY COUNTY

Bridge Replacement - CCS

On IA 48 over Red Oak Creek
1.3 Mi S Jct. US 34

Refer to the Plan Sheets for list of applicable specifications.

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



Revisions

	TOTAL
	141
PROJECT IDENTIFICATION NUMBER	
21-69-048-010	
PROJECT NUMBER	
BRF-048-2(50)--38-69	
R.O.W. PROJECT NUMBER	
-	
PROJECT DIRECTORY NUMBER	
6904801021	

Standard Road Plans

Standard Road Plans are listed on Sheet Number C.15

Design Data Urban			
2026 AADT	4,400	V.P.D.	
2046 AADT	5,600	V.P.D.	
TRUCKS	8	%	

Index of Seals		
Sheet No.	Name	Type
A.1	Mark C. Currie	Structural Design
*V.4	Brian J. Birkland	Hydraulic Design
**SPS.1	Ujwala Manchikanti	Geotechnical Design
**CS.1	Ujwala Manchikanti	Geotechnical Design
*A.3	Lucas Fatka	Roadway Design
***MWM.1	Blake Birkel	Roadway Design

* Provided by WHKS & Co.
** Provided by Terracon Consultants, Inc.
*** Provided by JEO Consulting Group

Structural Design

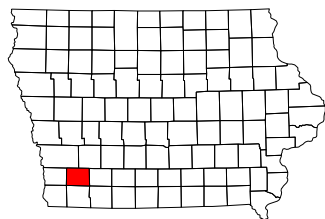
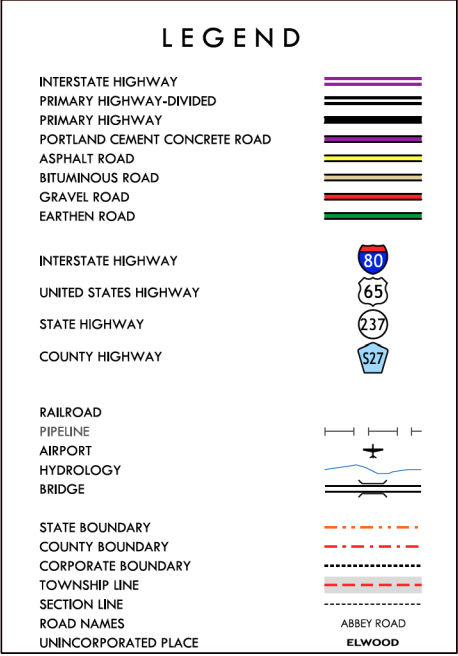
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Mark C. Currie 09-29-2025
Date

Printed or Typed Name

My license renewal date is December 31, 2025

Pages or sheets covered by this seal: A.1-A.2, V.1-V.34



City of Red Oak Location Map

Not To Scale

Summary of Concrete Quantities

Location	Structural Concrete
South Abutment Footing (Stage 1)*	8.5
North Abutment Footing (Stage 1)*	8.5
Superstructure (Stage 1)	94.8 (F)
South Abutment Footing (Stage 2)*	11.8
North Abutment Footing (Stage 2)*	11.8
Superstructure (Stage 2)	131.7 (F)
Pier No. 1 (Stage 1)	16.4
Pier No. 1 (Stage 2)	21.5
Pier No. 2 (Stage 1)	16.4
Pier No. 2 (Stage 2)	21.5
East Raised Sidewalk	12.0
East Approach Sidewalk Slabs	5.2
West Raised Sidewalk	12.0
West Approach Sidewalk Slabs	5.2
Total (Cu. Yds.)	377.3

Summary of Reinforcing Steel

Location	Non-Coated Reinforcing Steel	Stainless Steel Reinforcing Steel	Epoxy Coated Reinforcing Steel
Superstructure(*)	-	256	54,720
South Abutment Footing	-	-	2,898
North Abutment Footing	-	-	2,898
Pier No. 1	24,373	-	-
Pier No. 2	24,373	-	-
East Barrier Rail	-	500	1,158
East Sidewalk	-	-	1,161
West Barrier Rail	-	404	1,036
West Sidewalk	-	-	1,051
East Sidewalk Approach Slabs	-	38	450
West Sidewalk Approach Slabs	-	37	449
Total (Lbs.)	48,746	1,235	65,821

(*) Includes Bridge Slab, Abutments and Abutment Wings.

Summary of Excavation

Location	Class 20 Excavation
South Abutment (Stage 1)	43.6
North Abutment (Stage 1)	36.3
South Abutment (Stage 2)	45.7
North Abutment (Stage 2)	38.0
Total (Cu. Yds.)	163.6

Summary of Foundations

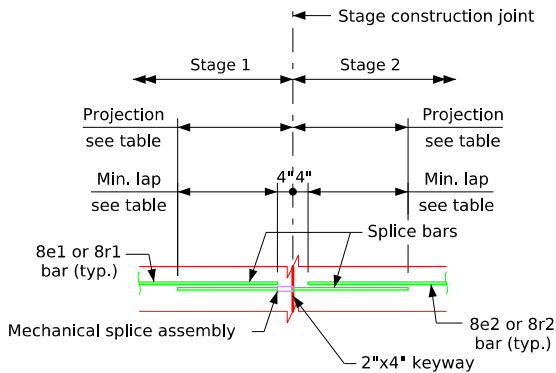
[illegible]

Summary of Structural Steel

Location	Total (Lbs.)
Bridge Deck Drains 4 @ 32 Lbs.	128
Water Line Support Assemblies 8 @ 78 Lbs.	624
Total (Lbs.)	752

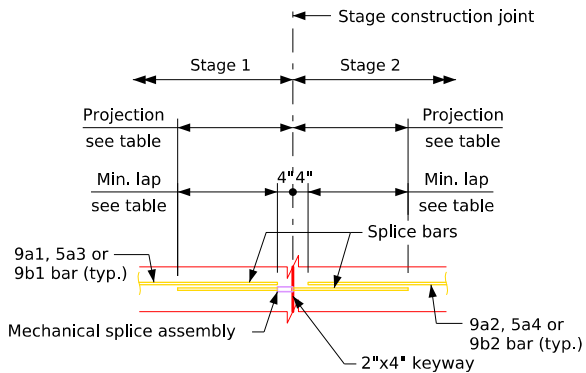
Mechanical Splice Dimension Table

Bar	Projection	Min. lap
5a	3'-0"	2'-8"
8e	6'-0"	5'-8"
8r	6'-0"	5'-8"
9a	6'-1"	5'-9"
9b	6'-1"	5'-9"



Mechanical Splice Detail

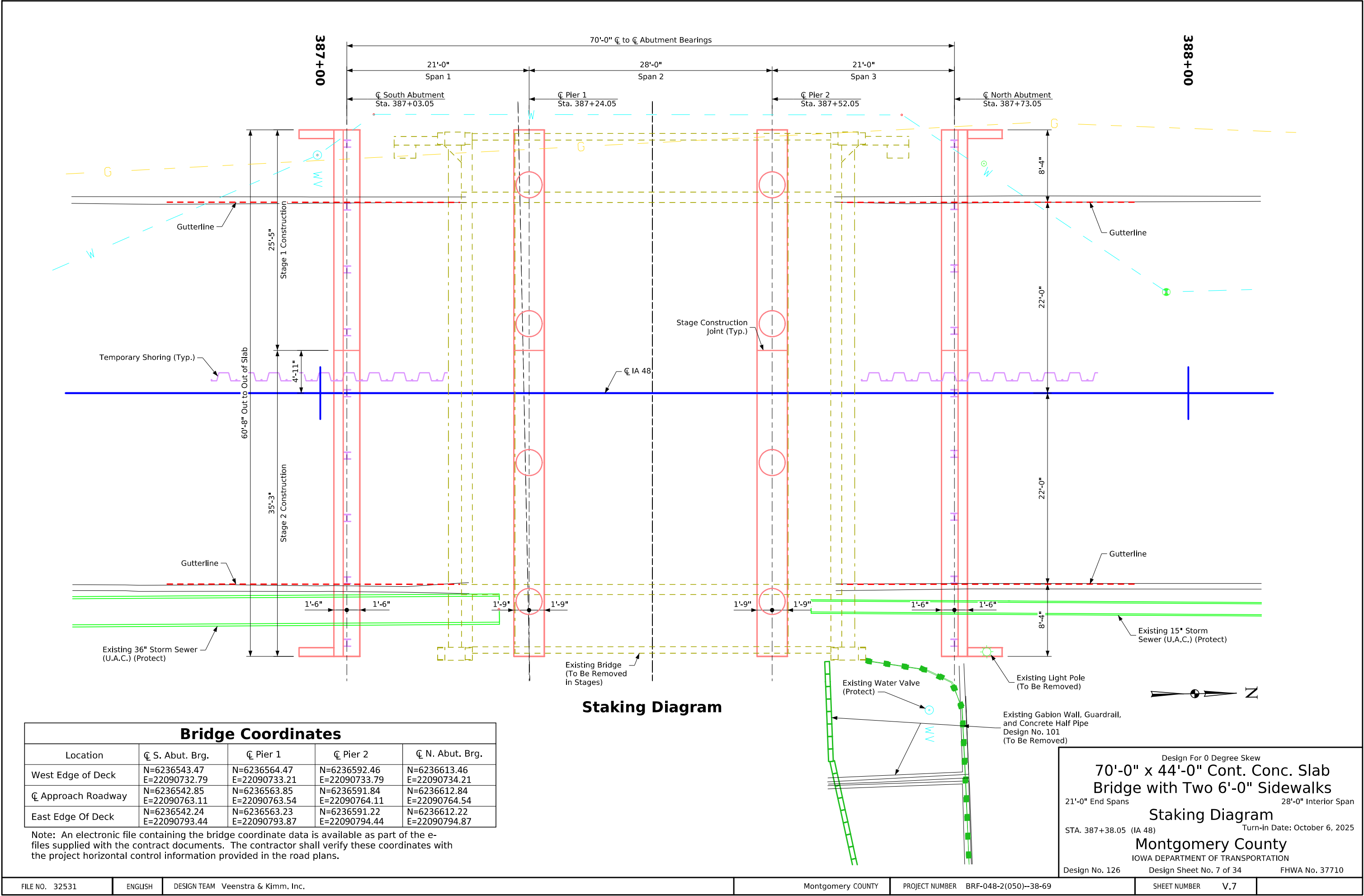
(For Epoxy Coated Reinforcement)



Mechanical Splice Detail

(For Non-Coated Reinforcement)

FILE NO.	32531	ENGLISH	DESIGN TEAM	Veenstra & Kimm, Inc.	MONTGOMERY COUNTY	PROJECT NUMBER	BRF-048-2(050)--38-69	SHEET NUMBER	V.2
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Bridge Coordinates				
Location	CL S. Abut. Brg.	CL Pier 1	CL Pier 2	CL N. Abut. Brg.
West Edge of Deck	N=6236543.47 E=22090732.79	N=6236564.47 E=22090733.21	N=6236592.46 E=22090733.79	N=6236613.46 E=22090734.21
CL Approach Roadway	N=6236542.85 E=22090763.11	N=6236563.85 E=22090763.54	N=6236591.84 E=22090764.11	N=6236612.84 E=22090764.54
East Edge Of Deck	N=6236542.24 E=22090793.44	N=6236563.23 E=22090793.87	N=6236591.22 E=22090794.44	N=6236612.22 E=22090794.87

Note: An electronic file containing the bridge coordinate data is available as part of the e-files supplied with the contract documents. The contractor shall verify these coordinates with the project horizontal control information provided in the road plans.

Design For 0 Degree Skew

70'-0" x 44'-0" Cont. Conc. Slab

Bridge with Two 6'-0" Sidewalks

21'-0" End Spans 28'-0" Interior Span

Staking Diagram

STA. 387+38.05 (IA 48) Turn-in Date: October 6, 2025

Montgomery County

IOWA DEPARTMENT OF TRANSPORTATION

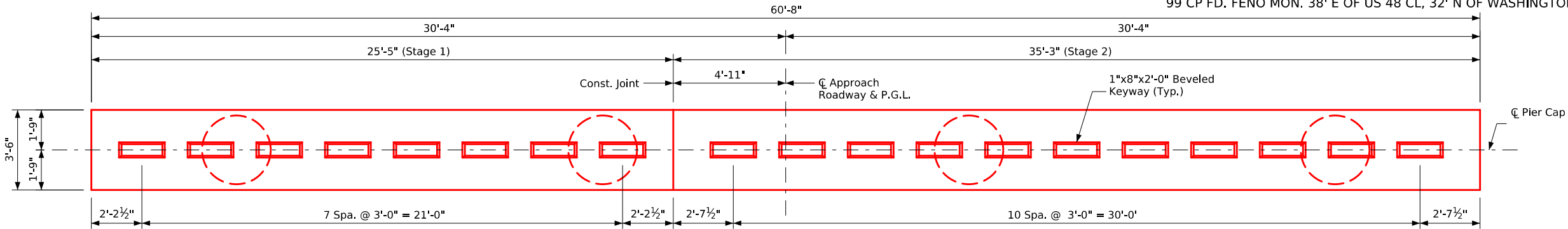
Design No. 126 Design Sheet No. 7 of 34 FHWA No. 37710

Benchmark: 98 CP FD. FENO MON. 6' E OF SE CORNER OF PARKING LOT, N=6236638.61, E=22090669.41, EL.=1035.89
99 CP FD. FENO MON. 38' E OF US 48 CL, 32' N OF WASHINGTON ST, N=6236783.02, E=22090806.12, EL.=1036.66

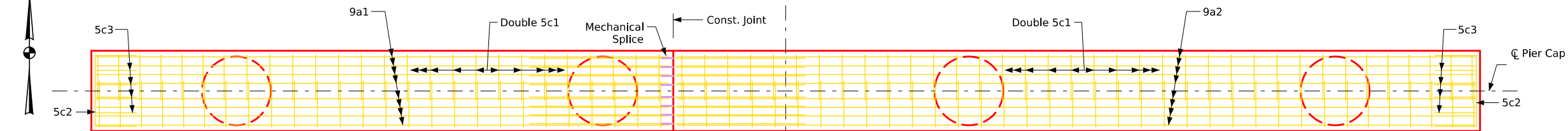
Pier Notes:

For Section A-A, B-B, Detail A, and end view reinforcing, see Design Sheet No. 9.

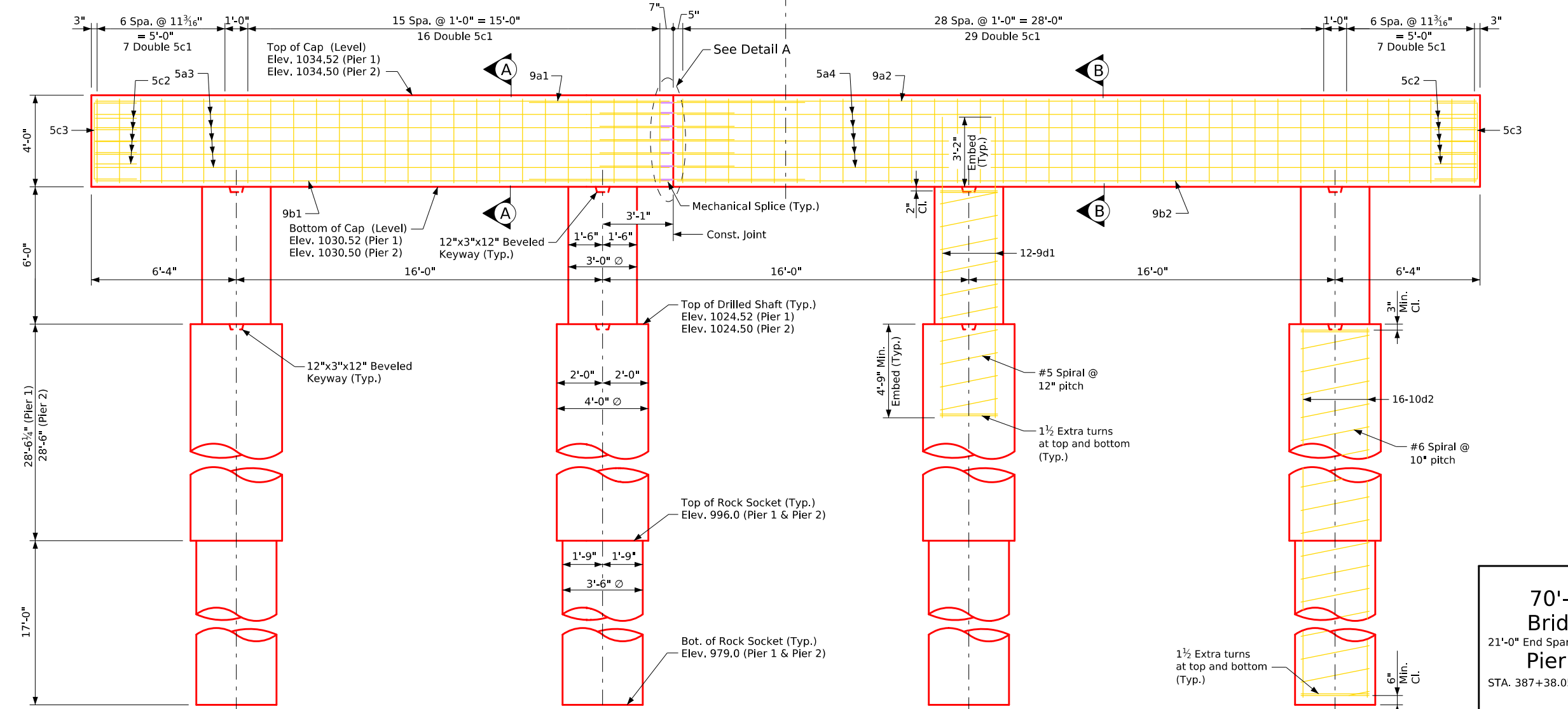
For sections of 36" Ø column and 48" Ø drilled shaft, see Design Sheet No. 9.



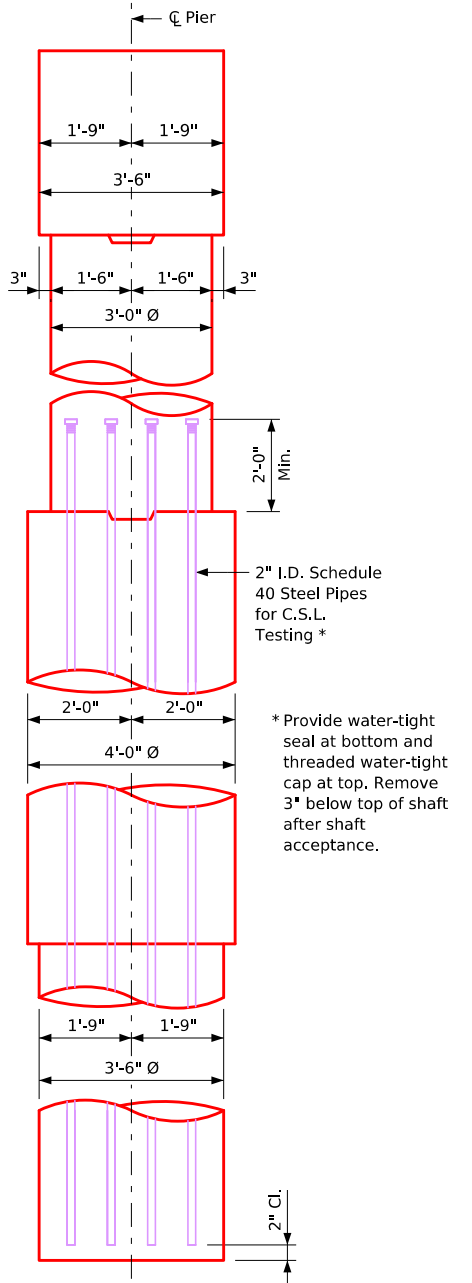
Pier Cap Plan (Piers 1 & 2)



Pier Cap Plan (Piers 1 & 2)

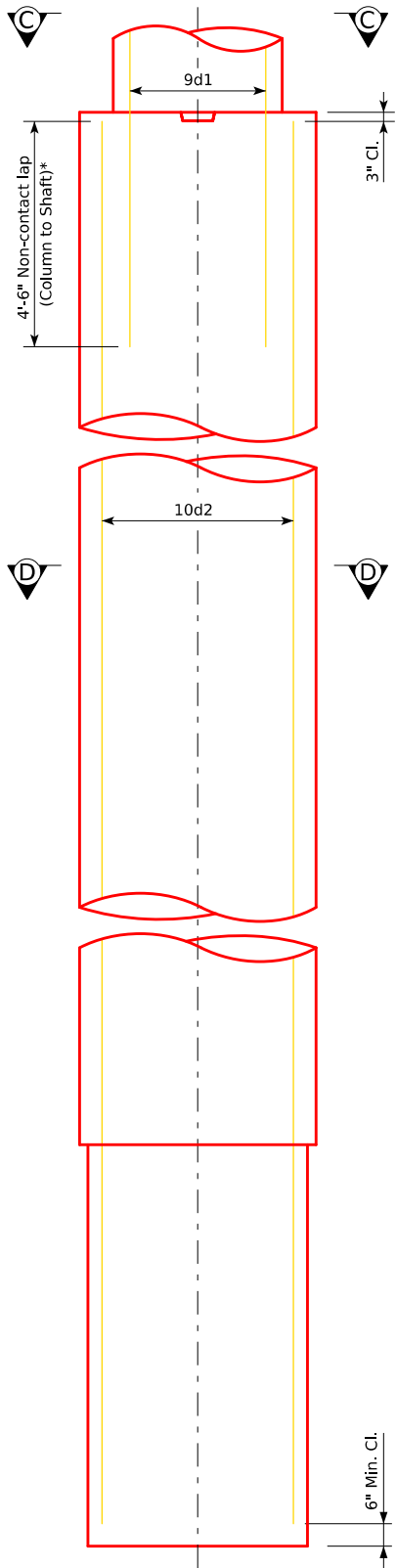


Pier Elevation (Piers 1 & 2)
(Looking North)



End Elevation

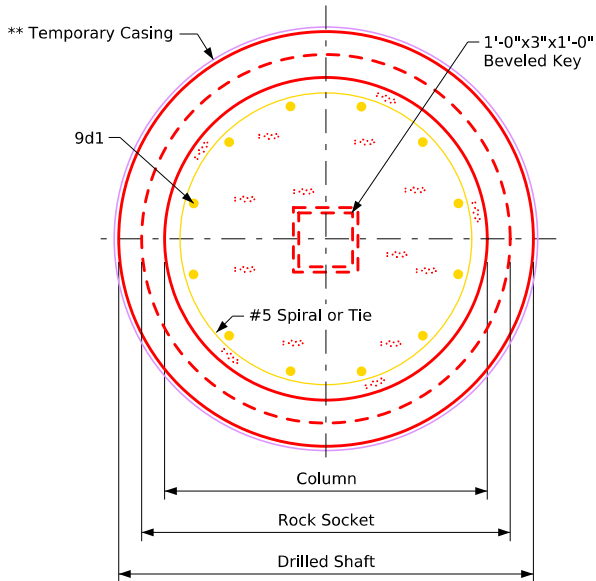
Design For 0 Degree Skew
70'-0" x 44'-0" Cont. Conc. Slab
Bridge with Two 6'-0" Sidewalks
21'-0" End Spans 28'-0" Interior Span
Pier Details - Plan and Elevation
STA. 387+38.05 (IA 48) Turn-in Date: October 6, 2025
Montgomery County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 126 Design Sheet No. 8 of 34 FHWA No. 37710



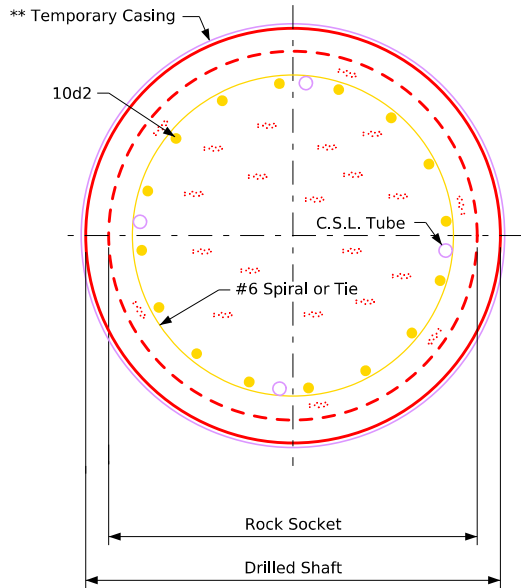
**Drilled Shaft Reinforcing
Splice Detail at Piers**
(Spiral not shown for clarity.)

* Non-Contact Lap Splice Note:
Minimum length of column-to-shaft
reinforcing lap is as shown. Column
cage must be supported and tied
to shaft cage or positively secured
by other means to prevent shifting
of column cage during concrete
placement.

** Temporary casing if required,
see Standard Specifications
Section No. 2433.



Section C-C



Section D-D

Pier Notes:

All exposed corners 90° or sharper are to be filleted with a ¾" dressed and beveled strip.

Minimum clear distance from face of concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.

Reinforcing shall be securely wired in place before concrete is placed. No exceptions to this requirement shall be permitted.

Spiral reinforcing is to be No. 5 bar (Columns) and No. 6 bar (Shafts), with pitches as shown in these plans. Place 4 equally spaced L ⅞x⅞x⅝ spacers punched to hold spirals. Spirals are to have 1½ extra turns at top and bottom of columns and shafts.

The spiral reinforcing may be spliced by lapping 2'-8" (No. 5 bar) or 3'-2" (No. 6 bar). The length of spiral shown does not include the lapped length of the splices. The cost of the laps at splices shall be incidental to the bid item "Concrete Drilled Shaft, 48 in. Diameter".

The spiral reinforcing may be substituted with circular ties spaced at the same intervals as the spiral reinforcing noted in these plans. Payment will be based on the weight of the spiral reinforcement. No adjustments in reinforcing steel pay weight will be allowed. See bent bar details for bar size and splice lap length.

Article 4151.03, A, 2, of the Standard Specifications shall not be permitted for spiral reinforcement.

Forms for pier caps on Piers 1 & 2 may be removed with the approval of the Engineer when the following two conditions have been met:

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

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

Drilled Shaft Notes:

Drilled shaft axial resistance is intended to be developed through skin friction between the shaft and the weathered shale materials indicated in the soil boring logs. Minimum rock socket depth into competent rock materials shall be as shown on Design Sheet No. 11. If differing site conditions are encountered, adjustment to the contract length may be required.

If the contract length of the drilled shafts must be increased by 6" or less, the rebar cage shall remain at the elevation shown in the plans. The clear space from the bottom of cage to bottom of shaft may be increased from 6" up to a maximum of 12". The C.S.L. tubes shall be lowered to maintain 2" clear from the bottom of the shaft.

If the contract length of the drilled shafts must be increased by more than 6", the rebar cage must be lengthened. The Contractor has the option to either:

- 1) Provide longer vertical bars without introducing a splice, or
- 2) Lengthen the vertical bars using contact lap splices. Minimum splice lengths shall be 5'-9" for drilled shafts. Lap splices shall be alternated such that 50% of the bars are spliced at the bottom of the shaft and the remaining 50% are spliced at the top of the shaft. Splice locations shall be a minimum of 10 feet apart. Regardless of which option is selected, the spiral reinforcing shall be lengthened to extend from top to bottom of rebar cage at the pitch called out in the plans. 1½ extra turns shall be provided at top and bottom of cage. Spirals may be lap spliced as described in the notes.

Drilled shafts shall be constructed in accordance with Section 2433 of the Standard Specifications. Excavation method shall be determined by the Contractor from the approved methods listed in the Specification and shall be subject to the Engineer's approval. Safety and constructability of the excavation shall be the responsibility of the Contractor. Temporary excavation casing may be required. Refer to the soil design sheets shown elsewhere in these plans.

The price bid for "Concrete Drilled Shaft, 48 in. Diameter" shall include all costs of materials and labor for excavation and concrete placement and all costs for C.S.L. testing.

Crosshole Sonic Log (C.S.L.) testing shall be required at each drilled shaft. Testing shall be in accordance with Article 2433.03, J, of the Standard Specifications.

The top of the C.S.L. tubes are to be recessed 3 inches after the shaft acceptance and prior to grouting.

The contract length of the drilled shafts is based on an as-constructed shaft diameter not exceeding 60 inches. If the excavation diameter exceeds this value during construction, the Engineer must be contacted to determine if modifications to the drilled shaft design are necessary. The Contractor shall be responsible for all costs associated with modifying the drilled shaft design to account for shaft diameter exceeding the maximum value noted in the plans.

The Contractor is responsible for the design of all drilled shaft temporary casing and permanent casing as needed for this project.

The total factored axial load for each drilled shaft is 500 kips.

Demonstration Shaft Notes:

Demonstration shaft shall conform to details for the 48 inch diameter drilled shaft on Designs Sheets No. 8 thru 11. Demonstration shaft shall be constructed at the location directed by the Engineer. Demonstration shaft shall extend to the elevations shown on Design Sheet No. 11, and shall extend a minimum of 3 ft. into solid weathered shale. Length of rock socket shall be determined by a boring at the location of the demonstration shaft socket.

The portion of the demonstration shaft below Elev. 1024.07 may remain in place.

All costs noted as incidental to "Concrete Drilled Shaft, 48 in. Diameter" shall also be incidental to the bid item "Demonstration Shaft." The bid price should also include the cost for the reinforcement in the Demonstration Drilled Shaft.

Design For 0 Degree Skew

70'-0" x 44'-0" Cont. Conc. Slab

Bridge with Two 6'-0" Sidewalks

21'-0" End Spans 28'-0" Interior Span

Drilled Shaft & Pier Details & Notes

STA. 387+38.05 (IA 48) Turn-in Date: October 6, 2025

Montgomery County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 126 Design Sheet No. 10 of 34 FHWA No. 37710