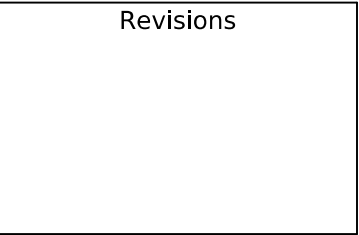


Index of Sheets	
No.	Description
Sheets	Bridge Plan
A.1	Title Sheet
A.2	Location Map Sheet
V.1	Estimated Quantities - Design No. 127
V.2 - V.16	Design No. 127
Road Sheets	Road Plan
A.3 - U.1	Road Plans
C.1 - C.2	Estimated Quantities - Road
C.8	Standard Plans - Road



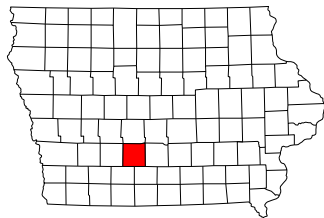
	TOTAL
	51
PROJECT IDENTIFICATION NUMBER	
22-61-092-010	
PROJECT NUMBER	
BRF-092-4(030)--38-61	
R.O.W. PROJECT NUMBER	
PROJECT DIRECTORY NUMBER	
6109201022	

PLANS OF PROPOSED IMPROVEMENT ON THE PRIMARY ROAD SYSTEM MADISON COUNTY Bridge Deck Replacement

**IA 92 over Middle River
2.0 mi W of SR P-53**

Refer to the Plan Sheets for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.13 of the Specifications.



Standard Road Plans

Standard road plans are listed on sheet number C.8.

Iowa DOT Bridges and Structures
Consultant Coordinator Contact:
Zahrah Alghalibi

Design Data Rural

2024 AADT	1,490 V.P.D.
TRUCKS	20 %

Index of Seals

Sheet No.	Name	Type
A.1	Nathan P. Langel	Structural Design
A.3	Tanner J. Clevenger	Roadway Design

Structural Design

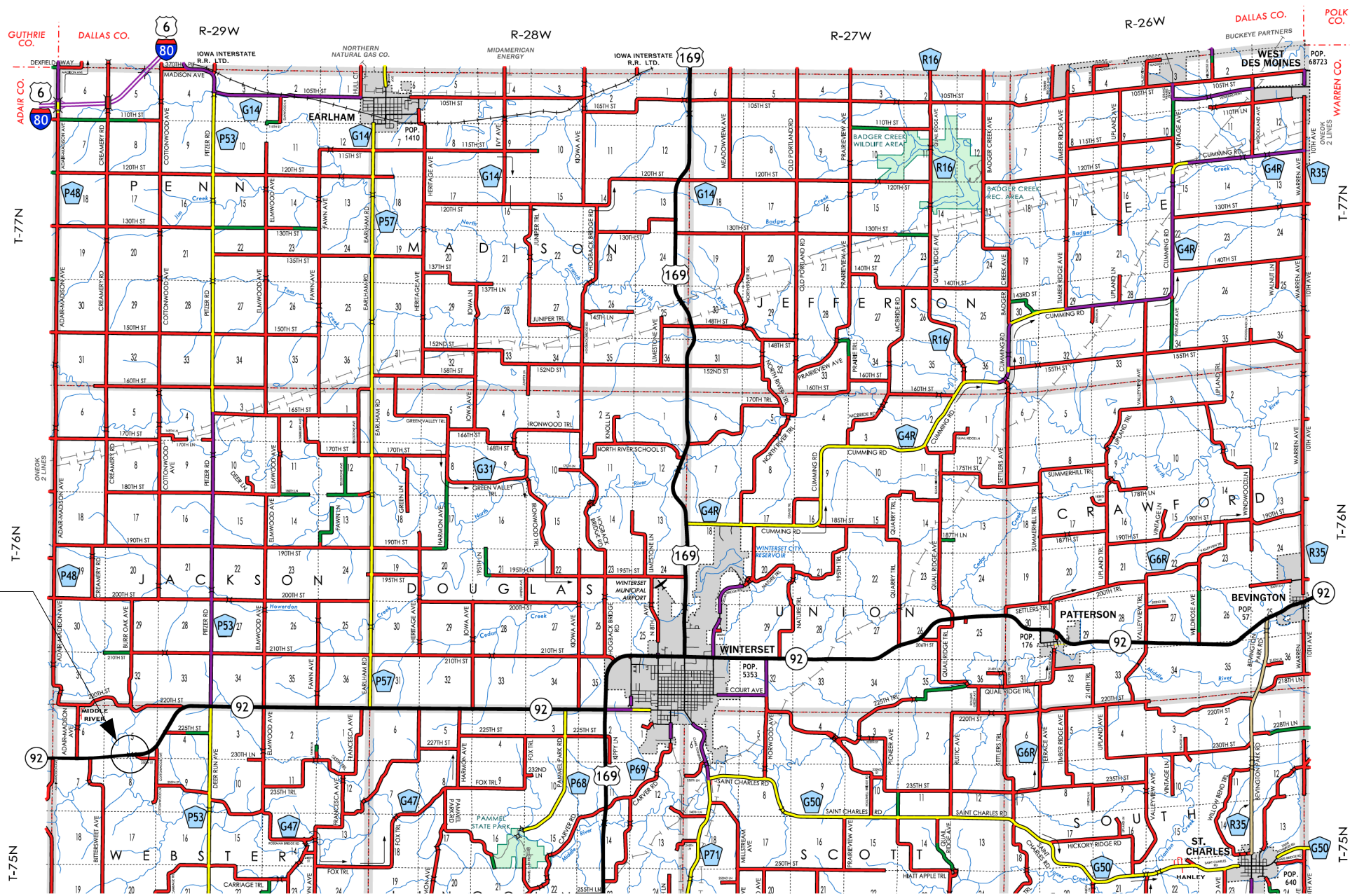
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Nathan Langel 7-13-2026
Signature Date

Printed or Typed Name _____

My license renewal date is December 31, 2027

Pages or sheets covered by this seal: A.1 Thru A.2 & V.1 Thru V.16



LEGEND

INTERSTATE HIGHWAY

PRIMARY HIGHWAY-DIVIDED

PRIMARY HIGHWAY

PORTLAND CEMENT CONCRETE ROAD

ASPHALT ROAD

BITUMINOUS ROAD

GRAVEL ROAD

EARTHEN ROAD

INTERSTATE HIGHWAY

UNITED STATES HIGHWAY

STATE HIGHWAY

COUNTY HIGHWAY

RAILROAD

PIPELINE

AIRPORT

HYDROLOGY

BRIDGE

STATE BOUNDARY

COUNTY BOUNDARY

CORPORATE BOUNDARY

TOWNSHIP LINE

SECTION LINE

ROAD NAMES

UNINCORPORATED PLACE

STATE PARKS

STATE INSTITUTIONS

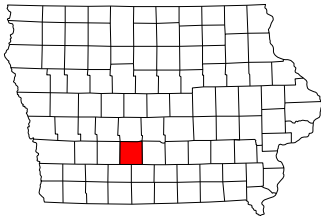
FEDERAL LAND

Design No. 127
FHWA No. 34810



Madison County Location Map

Not To Scale



Estimated Bridge Repair Quantities					
Item No.	Item Code	Item	Unit	Design No. 127	As-Built Qty.
1	2401-6750001	Removals, As Per Plan	LS	1.00	
2	2402-2720000	Excavation, Class 20	CY	28.2	
3	2403-0100010	Structural Concrete (Bridge)	CY	237.1	
4	2403-1000005	Fiber Reinforcement for Structural Concrete	CY	233.7	
5	2403-1000010	Trial Batch and Test Placement (Fiber Reinforced Concrete)	LS	1.00	
6	2404-7775005	Reinforcing Steel, Epoxy Coated	LB	88,068	
7	2404-7775009	Reinforcing Steel, Stainless Steel	LB	4175	
8	2408-7800000	Structural Steel	LB	611	
9	2414-6424110	Concrete Barrier Railing	LF	433	
10	2499-2300001	Deck Drains	LS	1.00	
11	2502-8212304	Subdrain, Standard, Perforated, 4 In., As Per Plan	LF	69.5	
12	2507-6799000	Bank Shaping	LS	1.00	
13	2526-8285040	Construction Survey, Location Survey	LS	1.00	
14	2533-4980005	Mobilization	LS	1.00	

ESTIMATE REFERENCE INFORMATION		
Item No.	Item Code	Description
1	2401-6750001	Removals, As Per Plan Includes all work for removal and off-site disposal of bridge deck, curbs, barrier rails, abutment backwalls, abutment diaphragms, end section footings, and sliding plate joint. Removal of scheduled items shall be in accordance with Section 2401, of the Standard Specifications. Any damage to material not to be removed shall be the responsibility of the Contractor and repaired at no extra cost to the State. Contractor to add the following information when submitting the Iowa DNR "Notification of Bridge Demolition and Renovation" form: Name of Asbestos Inspector: Brad Azeltine Date Inspected: 6-7-2022 IA License Number: Iowa DOT Inspector Phone: 515-239-1938 Procedure used to detect the presence of asbestos materials: Polarized Light Microscopy (PLM)
2	2402-2720000	Excavation, Class 20 Includes cost for all material, equipment, and labor necessary to furnish and place the floodable backfill between existing wings as shown on the Abutment Backfill Detail.
3	2403-0100010	Structural Concrete (Bridge) Includes all resilient joint filler required. Includes cost of setting dowels in drilled holes. Includes cost of furnishing and placing splash basins.
4	2403-1000005	Fiber Reinforcement for Structural Concrete This bid item includes the fiber reinforcement for the deck and abutment diaphragm concrete. Refer to "Developmental Specifications for Fiber Reinforcement for Structural Concrete" for additional information.
5	2403-1000010	Trial Batch and Test Placement (Fiber Reinforced Concrete) Includes all work and materials necessary for trial batch and test placement for fiber reinforced concrete. Refer to "Developmental Specifications for Fiber Reinforcement for Structural Concrete" for additional information.
6	2404-7775005	Reinforcing Steel, Epoxy Coated - -
7	2404-7775009	Reinforcing Steel, Stainless Steel - -
8	2408-7800000	Structural Steel Includes furnishing and placing shear studs.
9	2414-6424110	Concrete Barrier Railing If placement of concrete is done by the slipforming method, Class BR concrete is required. Cast-in-place barrier rails shall use Class C mix. Price bid for this item shall include the cost of cast-in-place forms if required for placement of the concrete
10	2499-2300001	Deck Drains Includes all new deck drains. Refer to design sheets 3 & 10 for location, materials and the details of their construction. Measurement will be the lump sum for all deck drains required as specified in the plans. The payment shall be full compensation for furnishing all material, equipment and labor and for performance of all work necessary for fabricating and installing the deck drains as per plan.
11	2502-8212304	Subdrain, Standard, Perforated, 4 In., As Per Plan Includes the cost of furnishing and placing subdrain (including excavation), porous backfill, and subdrain outlet as detailed in these plans.
12	2507-6799000	Bank Shaping Includes all material, equipment, and labor to repair berm erosion in accordance with these plans.
13	2526-8285040	Construction Survey, Location Survey Includes field verifying existing dimensions in accordance with the General Notes.
14	2533-4980005	Mobilization - -



Roadway quantities show elsewhere in these plans.

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans82'-0" Interior Span

Estimated Quantities

STA. 222+67.00 (IA 92)Turn-In Date: August 2026

Madison County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127Design Sheet No. 001 of 16FHWA No. 34810

General Notes:

This design is for repairs to the existing 210'-0" x 30'-0" continuous I-beam bridge on IA 92 over Middle River. Electronic copies of original design plans and repair plans are available to the Contractor as part of the e-Files supplied with the contract documents. Shop drawings will be available to the Contractor by contacting the Office of Contracts Highway Division - Iowa DOT - Ames. Dimensions shown on these plans are based on design plans (Original Design No. 965, and Repair Design Nos. 991 & 194).

See Situation Plan on Design Sheet 3 for list of repair items.

Utility Companies whose facilities are shown on the plans or known to be within the construction limits shall be notified by the Contractor of the construction starting date.

Faint lines on plans indicate the existing portions of the bridge.

All alignment, stationing, connecting dimensions, and elevations used in the new details in these plans were developed based on the existing bridge plans and field survey. The Bridge Contractor shall field verify these details before starting construction.

This bridge is designed for HS20-44 loading plus 20 lbs. per square foot of roadway for future wearing surface.

The roadway will be closed to thru traffic. Refer to the traffic control plan note on this sheet.

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

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

The lump sum bid for "Removal, as per Plan" shall include all costs associate with removing the existing bridge deck, curbs, barrier rails, abutment backwalls, abutment diaphragms, end section footings, and sliding plate joint. Removal of scheduled items shall be in accordance with Section 2401 of the Standard Specifications. Any damage to any steel or concrete not to be removed shall be the responsibility of the Contractor and repaired at no extra cost to the State.

Concrete removal shall be initiated with a 3/4" saw cut wherever possible.

In the event that one or more of the existing steel beams or diaphragms is damaged during the deck removal, the Contractor shall replace the damaged member or members deemed unacceptable. All material, labor, equipment, and traffic control required for the removal and replacement of the damaged member or members shall be considered incidental to the lump sum bid for "Removal, as per Plan". Any damaged members which are not to be reused shall become the property of the Contractor.

It shall be the Bridge Contractor's responsibility to provide sites for excess excavated material. No payment for overhaul will be allowed for material hauled to these sites.

The Bridge Contractor shall reconstruct the slopes around the wings which are disturbed during construction. This work shall be considered incidental and no extra payment will be made.

Concrete barrier rails placed using the slipform method will require the use of Class BR concrete in accordance with Article 2513.03, A, 2, of the Standard Specifications. Cast-in-place barrier rails shall use Class C mix. Class D concrete is not permitted for concrete barrier rails (cast-in-place or slipformed method).

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

Kewyay 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.

The abutment backwalls as shown shall be constructed using Structural Concrete Class C. Promptly after the concrete has been placed and vibrated as provided in Articles 2403.03, C, and 2403.03, D, of the Standard Specifications it shall be hand finished to provide a smooth surface.

No torchwork, cutting, grinding, or drilling of holes on the existing structural steel of the bridge shall be performed when the air temperature and steel temperature are below 40°F.

The Contractor is responsible to provide sufficient temporary bracing to minimize lateral deflection and rotaion of exterior steel beams during deck placement. Lateral deflection and rotation of exterior beams may result in thin deck and an upward shift in bar mats which can decrease concrete cover. Partially or fully installed permanent bracing as shown in these design plans shall not be assumed sufficient to minimize lateral deflection and rotation of exterior beams during deck placement. Temporary bracing shall not be welded to the steel beams or its attachments including the studs.

Deck Removal Notes:

The Bridge Contractor is to use extreme care when removing the deck concrete at the beam locations to avoid damaging the top flange and shear connectors of the beam. Prior to commencing any deck removal work, the Contractor shall submit a demolition plan to the Engineer for approval. The Contractor shall notify the Engineer of the start date for deck removal work in order to demonstrate the removal procedure on a small portion of the deck while the Inspector is present. Damage may require the Contractor to modify the removal process prior to approval to proceed.

Once the deck concrete over the beam is removed, all remaining debris shall be cleaned from the beams to provide a suitable bond to the concrete deck.

The existing shear connectors are an integral part of the existing beam top flange. All damage sustained to the top flange and/or shear connectors shall be identified and repaired. In addition to being repaired, any damage located in a negative moment region shall undergo magnetic particle testing for cracks.

Acceptable repair methods:

- Girder Top Flange:
- Gouges - Grind out on a 10:1 taper.
 - Bends or Tears - To be evaluated by the Engineer.

- Angle and Bar Shear Lugs:
- Minor Gouges - Grind smooth.
 - Bends and Gougest to Angle - Grind sharp corners and, if in a negative moment region, magnetic particle test angle to flange weld. Any crack detected will necessitate the removal of the angle as noted below.
 - Tears to Angle - If in a negative moment region, remove angle by mechanically cutting to just above the top of flange, grind surface of flange smooth and perform magnetic particle testing on repair area. If in a positive moment region, remove angle by mechanically cutting to location of tear and grind sharp edges smooth.
 - Bend or Tear to Bar - Remove bar and grind top of angle smooth.

Magnetic particle testing is to be done at the Contractor's expense by and approved third party. Any cracks identified shall be repaired or the section of damaged girder replaced at the Engineer's direction at no additional cost to the State.

Existing shear connectors are considered for future structural capacity. Any damaged angle and bar shear lugs shall be replaced at the Contractor's expense with 2 rows of 3 - 7⁄8"Ø shear studs. Refer to superstructure details sheet for dimensions.

All material, equipment, and labor associated with removal of the deck and repair of any damage or beam shall be considered incidental to the bid item "Removals, as per plan".

Bank Shaping & Erosion Stone Notes:

The Contractor shall shape the east abutment berm as directed by the Engineer. Approximate limits of berm repair are shown on the situation plan, actual limits will be determined in the field by the Engineer. A constant grade along these limits is not required. Excess excavated material from other project activities may be used as fill as approved by the Engineer.

All costs for material, equipment, and labor required to perform the work noted and directed by the Engineer shall be included in the lump sum unit price bid for "Bank Shaping" no additional measurement or payment shall be made.

The disposal of excess soil from shaping or trenching shall be considered incidental to "Bank Shaping".

The Contractor shall be responsible for any plant materials destroyed adjacent to the bridge. The Contractor shall replant, reseed, and remulch all disturbed areas, designated by the Engineer, in accordance with Section 2601, of the Standard Specifications, at the Contractor's expense.

WORKING DRAWING AND CALCULATION SUBMITTALS

Working drawings and calculations shall be submitted for the following items shown in the table below. (Note additional working drawings and calculations may be required in accordance with Article 1105.03 of the Standard Specifications.)

Submittal requirements for working drawings and calculations shall be in accordance with 1105.03 of the Standard Specifications for Highway and Bridge Construction of the Iowa Department of Transportation. The absence of a certification requirement for a submittal does not relieve the Contractor of the responsibility to attain certification.

Calculation submittals in this table which are associated with working drawing submittals shall be submitted on the same day. Review time for calculation submittals shall be of the same duration as and run concurrently with review time for associated working drawings. The calculation submittals listed in the table are not meant to be an exhaustive list and do not relieve the contractor from providing additional calculation submittals if requested by the Engineer.

NO.	Working Drawing Description	Working Drawing File Name Convention for Submittal	Certified by Iowa P.E. (yes/no)
1	Deck Drains	(030)_Madison_Design127_DeckDrains.pdf	No
2	Demolition Plan	(030)_Madison_Design127_DemolitionPlan.pdf	Yes
NO.	Calculation Description	Calculation File Name Convention for Submittal	Certified by Iowa P.E. (yes/no)
3	Demolition Plan	(030)_Madison_Design127_DemolitionPlanCalcs.pdf	Yes

Specifications:

Design: AASHTO Series of 2002.

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.

Developmental Specifications for Fiber Reinforcing for Structural Concrete.

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO Standard Specifications for Highway Bridges, Series 2002.

Reinforcing steel in accordance with Section 8, Grade 60.

Concrete in accordance with AASHTO LRFD Section 8, f'c = 4.0 ksi.

Structural steel in accordance with AASHTO LRFD Section 10. ASTM A709 Grade 36, Grade 50, and Grade 50W (AASHTO M270 Grade 36, Grade 50 and Grade 50W)

Design History At This Site (Includes This Design)	
Des. No.	Type of Work
965	Original Design
991	Retrofit Rails
194	Bridge Deck Overlay
--	Scour Countermeasures
127	Deck Replacement

Traffic Control Plan:
The roadway will be closed to thru traffic. Refer to the traffic control plan shown elsewhere in these plans.

All plan dimensions are horizontal unless noted otherwise.

BRIDGE DECK DIMENSIONS TABLE

No.	Item	Unit	Quantity
1	Deck Length	L.F.	214.0
2	Deck Width	L.F.	35.2
3	Deck Area	S.F.	7,526

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

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans82'-0" Interior Span

General Notes

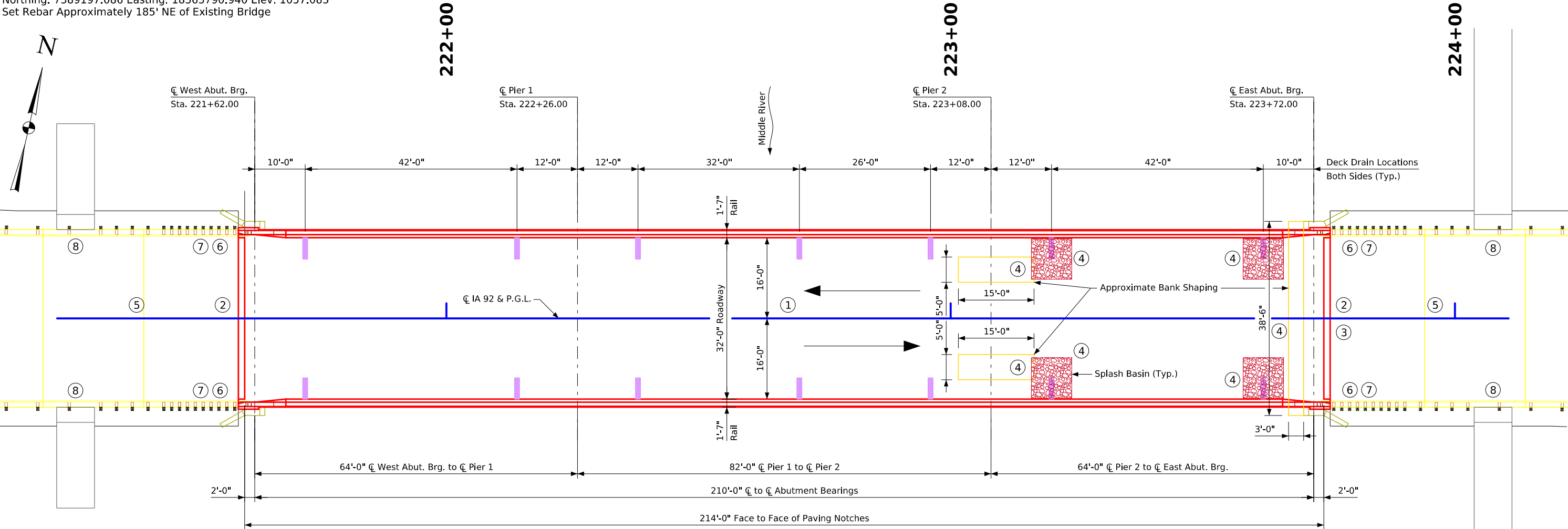
STA. 222+67.00 (IA 92)Turn-in Date: August 2026

Madison County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127Design Sheet No. 002 of 16FHWA No. 34810

Control Point:
Northing: 7389197.086 Easting: 18363790.940 Elev. 1057.083
Set Rebar Approximately 185' NE of Existing Bridge



Situation Plan

Repairs Shall Consist Of:

- ① Remove and reconstruct the bridge deck and barrier rails.
- ② Remove backwalls and reconstruct semi-integral abutments. Encase beam ends in semi-integral abutment.
- ③ Replace subdrain at east abutment.
- ④ Install splash basins and perform bank shaping.
- ⑤ Remove and replace approach pavement at both ends of bridge.
- ⑥ Remove and replace the existing guardrail with guardrail meeting current standards.
- ⑦ Install paved shoulder adjacent to guardrail.
- ⑧ Intall rock flumes for bridge end drains.

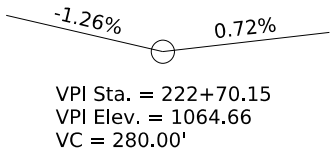
Note: See General Notes on Design Sheet 2 for Bank Shaping Notes.

Location

IA 92 over Middle River
T-75N R-29W
Section 5
Webster Township
Madison County
Maint. No. 6194.4S092
FHWA No. 34810
Latitude: 41.316873
Longitude: -94.213869

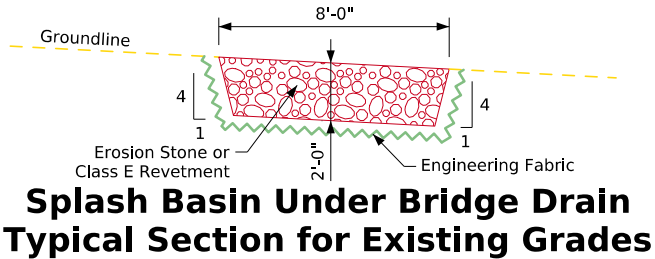
Design Data Rural

2024 AADT 1,490 V.P.D.
TRUCKS 20 %

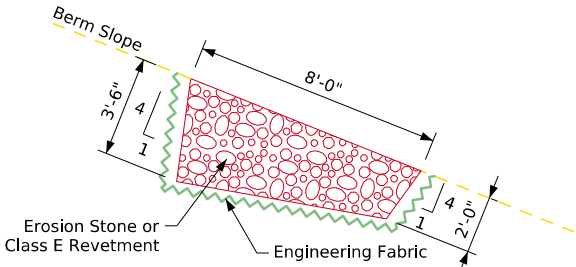


Proposed Profile
Grade - IA 92

Note:
Proposed P.G.L. differs from
existing P.G.L. based on survey.



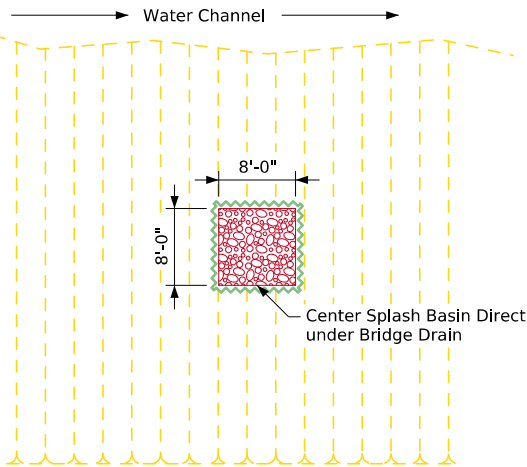
Splash Basin Under Bridge Drain
Typical Section for Berm Slopes

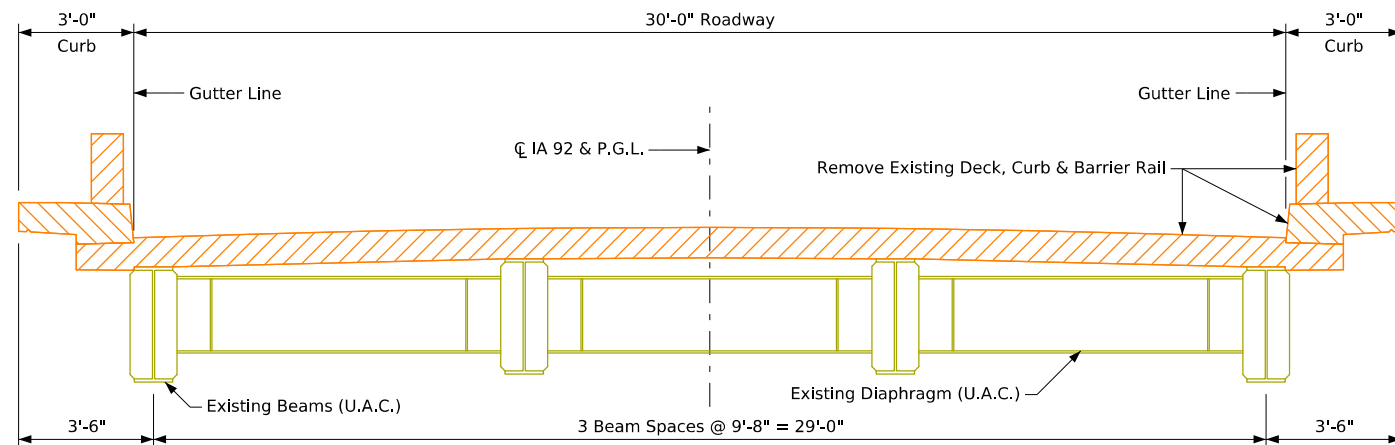


Splash Basin Notes:

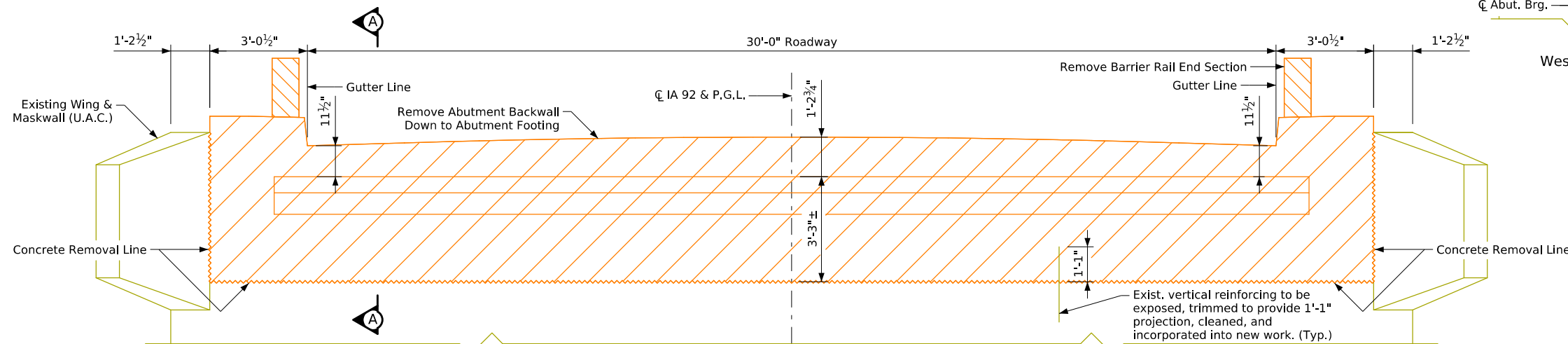
The cost of furnishing and placing splash basins (including excavation, erosion stone or Class E revetment, and engineering fabric) is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made. Total number of splash basins = 4.

Splash Basin Under Bridge
Drain Plan View

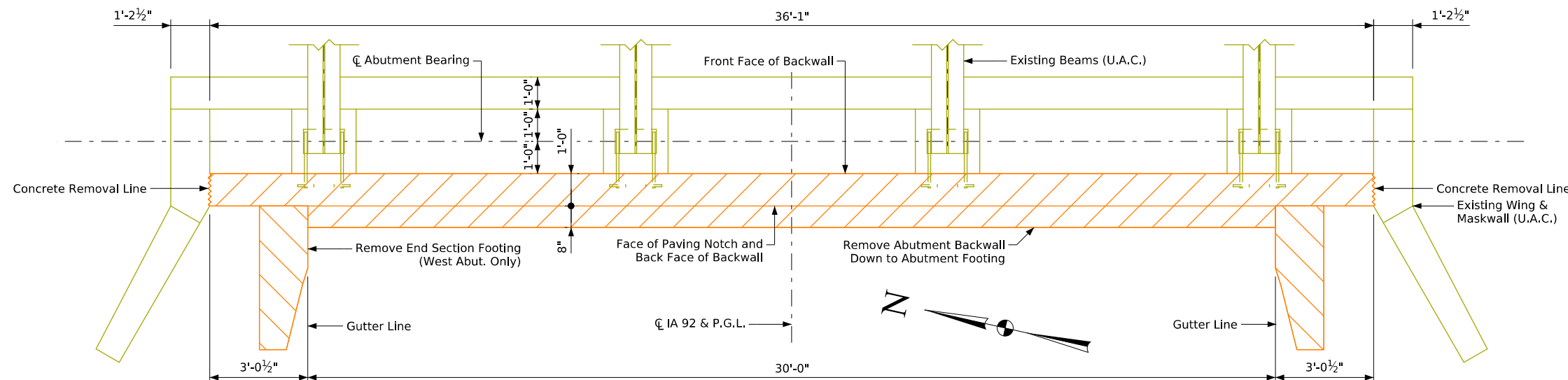




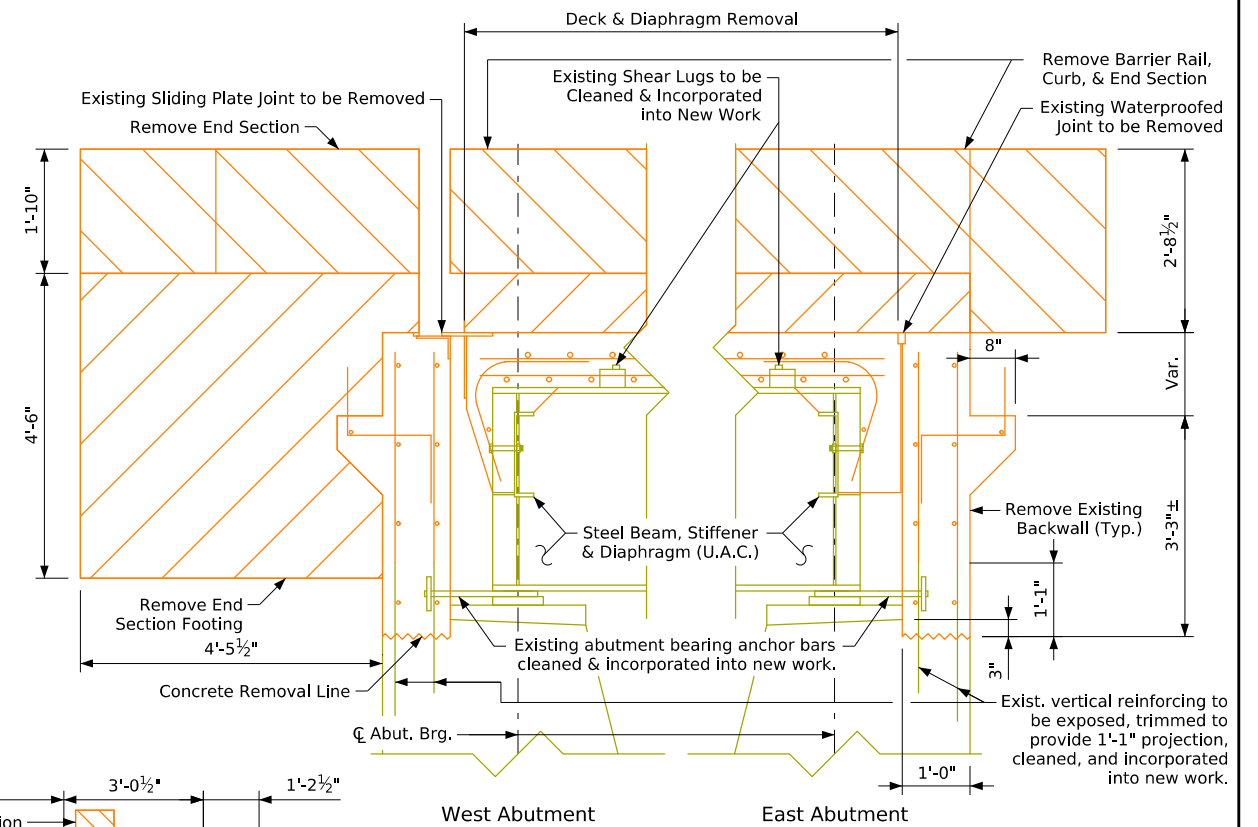
Bridge Cross Section



Abutment Rear Elevation
(West Abutment End Section Footing Not Shown)



Abutment Removal Plan
(West Abutment Shown, East Abutment Similar)



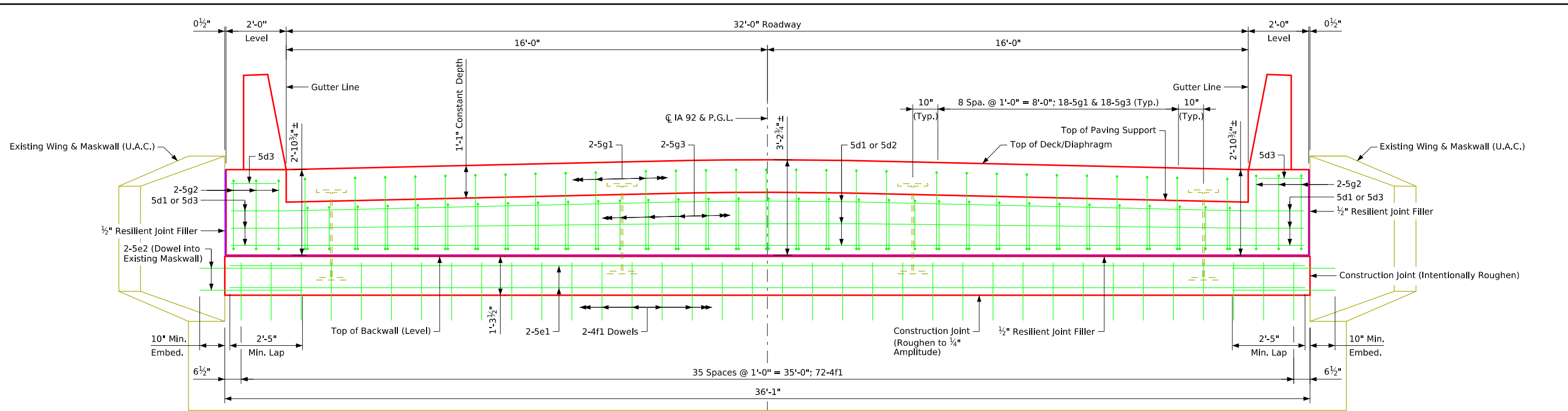
Section A-A

Removal Notes:

Existing vertical bars in the abutment backwall shall be cleaned and incorporated into new work. The bars shall be cut off 1'-1" above the concrete removal line.

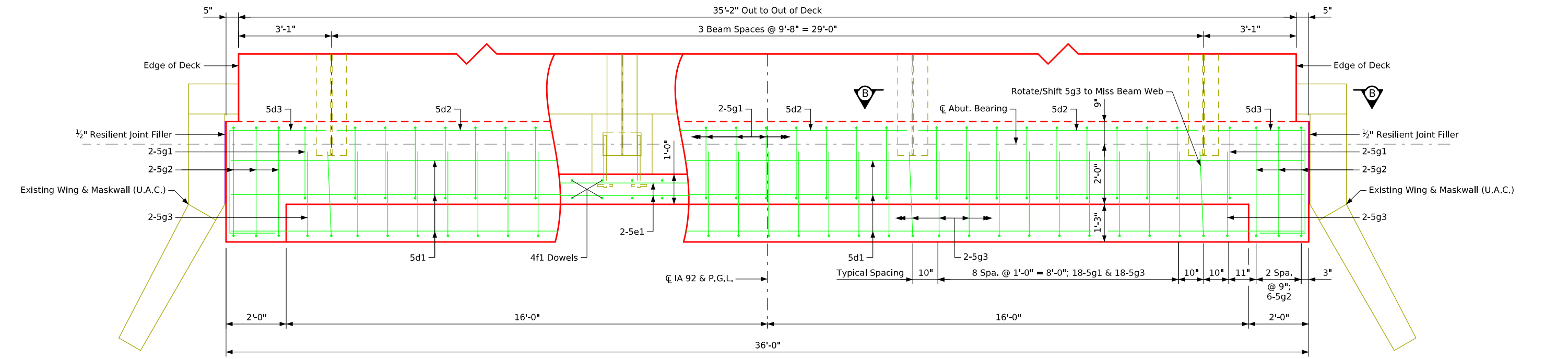
All other existing abutment, diaphragm, curb, barrier rail, end section, and deck bars are to be removed. Any reinforcing exposed during removals that does not extend into new concrete shall be cut off flush with the removal line and given two coats of zinc-rich paint.

Design For Repairs To 0° Skew		
210'-0" x 32'-0"		
Continuous I-Beam Bridge		
64'-0" End Spans		82'-0" Interior Span
Removal Details		
STA. 222+67.00 (IA 92)		Turn-in Date: August 2026
Madison County		
IOWA DEPARTMENT OF TRANSPORTATION		
Design No. 127	Design Sheet No. 004 of 16	FHWA No. 34810



Note:
4f1 bars may be shifted up to 3" to provide
clearance from existing reinforcing.

Abutment Rear Elevation
(Deck Reinforcement Not Shown for Clarity)
(Existing Abutment Backwall Reinforcing Not Shown for Clarity)

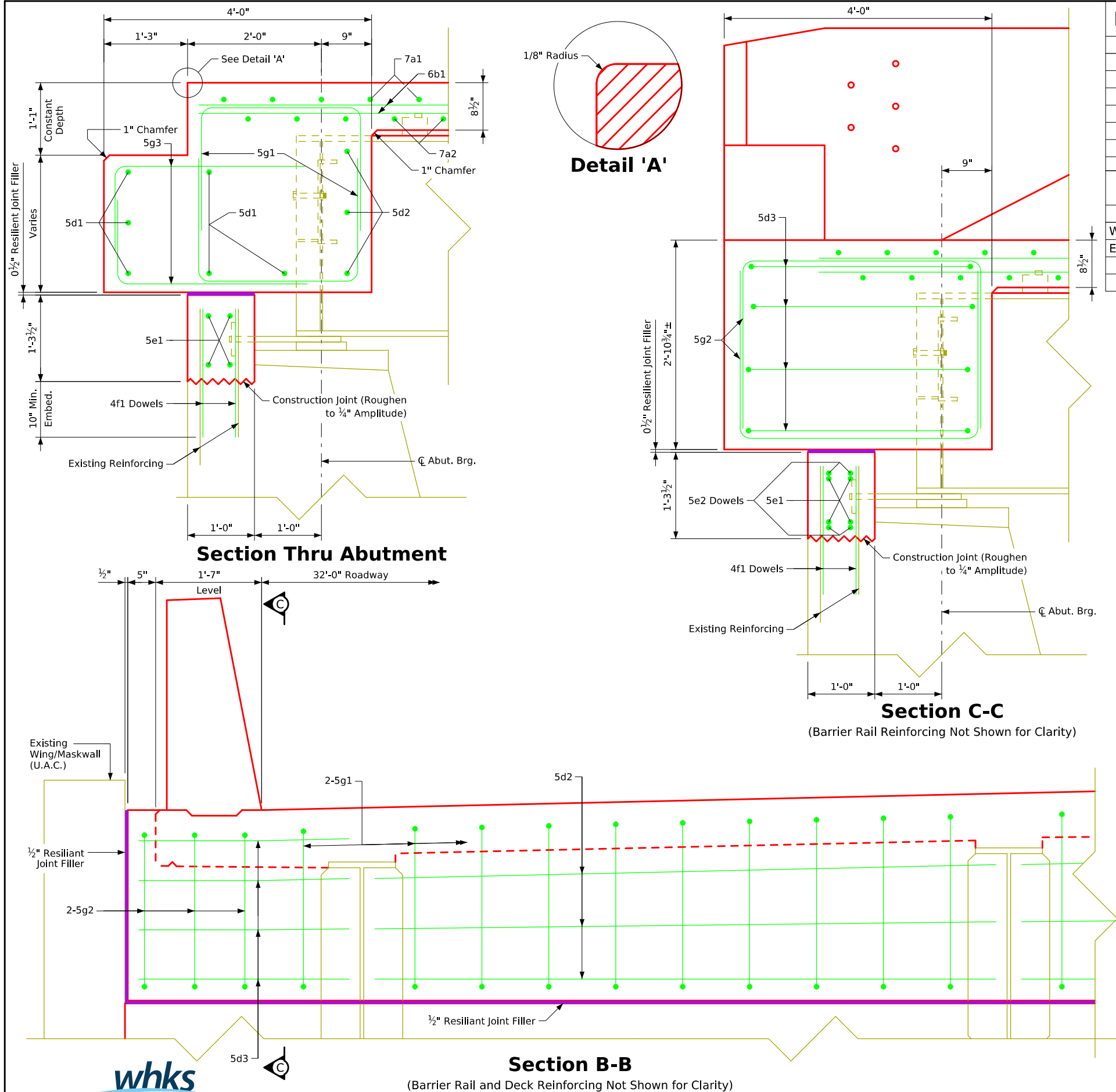


Abutment Plan View
(Barrier Rail and Deck Reinforcing Not Shown for Clarity)
(West Abutment Shown, East Abutment Similar)



Notes:
See Design Sheet 6 for "Section Thru Abutment", Section B-B, and abutment notes.

Design For Repairs To 0° Skew
210'-0" x 32'-0"
Continuous I-Beam Bridge
64'-0" End Spans 82'-0" Interior Span
Abutment Details
STA. 222+67.00 (IA 92) Turn-In Date: August 2026
Madison County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 127 Design Sheet No. 005 of 16 FHWA No. 34810



Epoxy Coated Reinforcing Steel - Two Abutment Backwalls					
Bar	Location	Shape	No.	Length	Weight
5e1	Backwall, Horizontal		8	35'-9"	298
5e2	Backwall, Horizontal, Dowel		16	3'-5"	57
4f1	Backwall, Vertical, Dowel		144	1'-11"	184
Reinforcing Steel (Epoxy-Coated) - Total (lbs.)					539
Concrete Placement Quantity					
Location					Total
West Abutment Backwall					1.7
East Abutment Backwall					1.7
Total Structural Concrete (Bridge) (Cubic Yards)					3.4

Abutment Notes:

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

The price bid for "Structural Concrete (Bridge)" shall include the costs of setting bars as dowels in the abutment footings and wings.

See Design Sheet 16 for excavation and abutment backfill details.

Dowel Setting Note:

- The 4f1 and 5e2 bars shall be set as dowels in drilled holes. Holes are to be 10" deep. The dowels shall be installed in accordance with the Manufacturer's recommendations. Either of the following systems may be used as a bonding agent for vertical dowels, but only system "A" may be used for horizontal dowels.
- A. Polymer grout system in accordance with Article 2301.03, E of the Standard Specifications.
 - B. Hydraulic cement grout systems. Drilled holes are to be 2 1/2 times the dowel diameter and are to be blown clean with compressed air immediately prior to placing grout. The hydraulic cement grout shall be one of those approved in Materials I.M. 491.13 and shall be used in accordance with the Manufacturer's recommendations.

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans82'-0" Interior Span

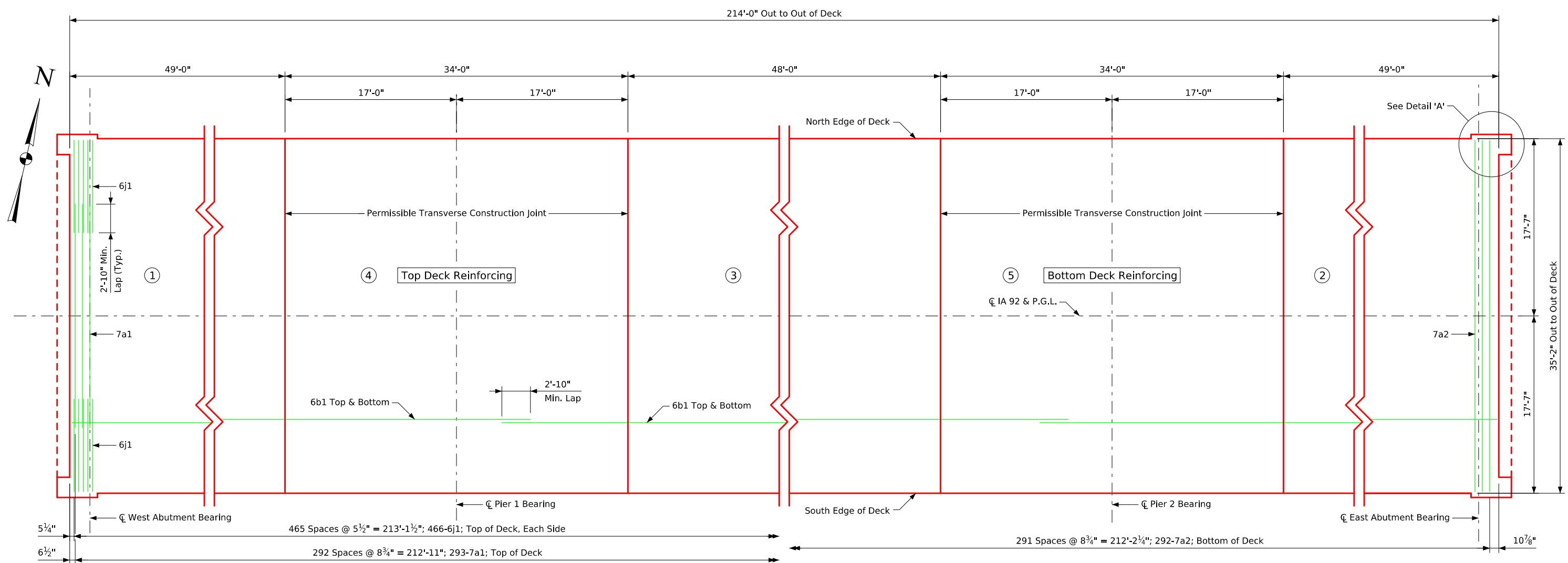
Abutment Details

STA. 222+67.00 (IA 92)Turn-In Date: August 2026

Madison County

IOWA DEPARTMENT OF TRANSPORTATION

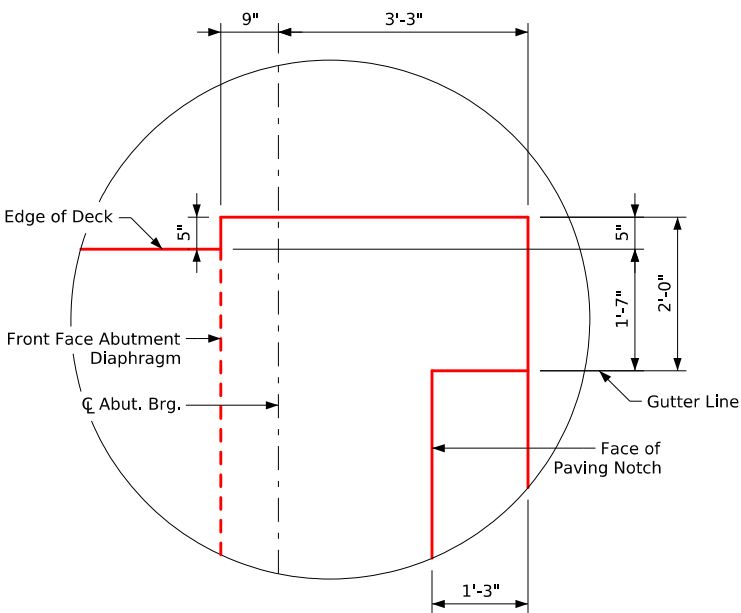
Design No. 127Design Sheet No. 006 of 16FHWA No. 34810



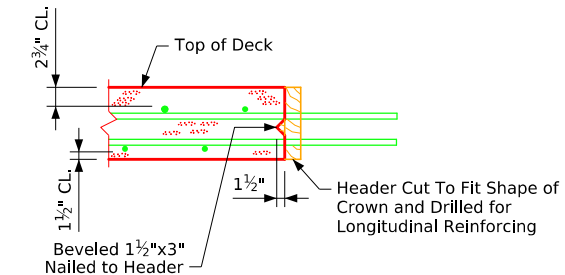
Concrete Placement Diagram & Deck Reinforcing Layout

Note: Concrete deck shall be placed in sections and sequences indicated. An approved alternate procedure is to place the concrete deck in one continuous pour beginning at one end of the bridge. Alternate procedures for placing deck concrete may be submitted for approval together with a statement of the proposed method and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required results. The Bridge Engineer shall review any alternate procedures. The cost of any additional analysis and plan modifications shall be paid for by the Contractor. The Engineer shall determine if a retarding admixture is required to maintain plasticity of the concrete deck during placement.

Deck concrete sections shall cure for a minimum of 48 hours and shall achieve a minimum strength of 75% of the 28 day deck concrete strength prior to removing deck headers and beginning an adjacent pour.



Detail 'A'
(Reinforcing Not Shown For Clarity)



PERMISSIBLE TRANSVERSE
DECK CONSTRUCTION JOINT

Design For Repairs To 0° Skew
210'-0" x 32'-0"
Continuous I-Beam Bridge
64'-0" End Spans 82'-0" Interior Span
Reinforcing Layout
STA. 222+67.00 (IA 92) Turn-In Date: August 2026
Madison County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 127 Design Sheet No. 008 of 16 FHWA No. 34810



Superstructure Notes:

The bridge deck as shown includes ¾" Intergral wearing surface.

Cost of all resilient joint filler material is to be included in the price bid for "Structural Concrete (Bridge)".

Forms for the deck and barrier rail are to be supported by the steel beams.

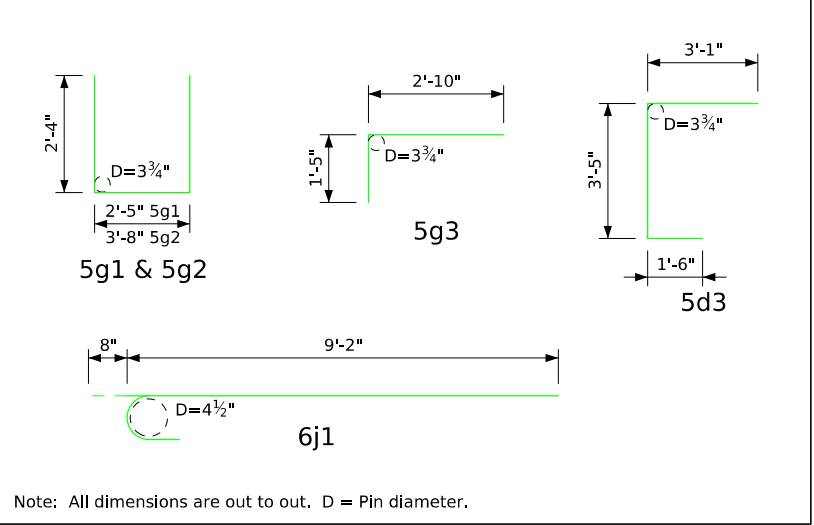
Clear distance from face of concrete to near reinforcing bar shall be 2" unless otherwise noted or shown.

All deck and diaphragm reinforcing is to be wired in place and adequately supported before concrete is placed.

Top transverse reinforcing steel is to be parallel to and 2¾" clear below top of deck.

Bottom transverse reinforcing steel is to be parallel to and 1½" clear above bottom of the deck. Top and bottom reinforcing steel is to be supported by individual bar chairs spaced at not more than 3'-0" centers longitudinally and transversely, or by continuous rows of bar high chairs or deck bolsters spaced 4'-0" apart. I.M. 451.01 requirements shall apply for bar chairs, bar high chairs, and deck bolsters.

Bent Bar Details



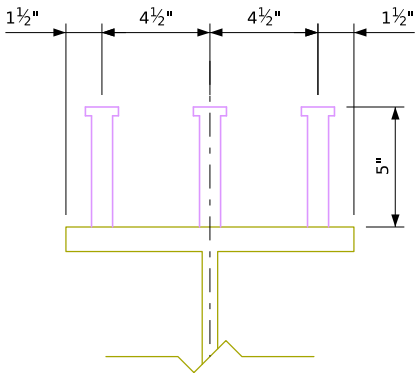
Epoxy Coated Reinforcing Steel - Superstructure

Bar	Location	Shape	No.	Length	Weight
7a1	Deck Transverse, Top		293	22'-2"	13,275
7a2	Deck Transverse, Bottom		292	34'-10"	20,790
6b1	Deck Longitudinal, Top & Bottom		510	38'-0"	29,109
5d1	Abutment Diaphragm, Horizontal, B.F.		12	35'-8"	446
5d2	Abutment Diaphragm, Horizontal, F.F.		18	9'-3"	174
5d3	Abutment Diaphragm, Horizontal, F.F. Ends		16	8'-0"	134
5g1	Abutment Diaphragm, Vertical		116	7'-1"	857
5g2	Abutment Diaphragm, Vertical, Ends		24	8'-4"	209
5g3	Abutment Diaphragm, Vertical		132	4'-3"	585
6j1	Deck Transverse, Top - At Rail		932	9'-10"	13,765
5u1	Deck at Drains		56	3'-0"	175
Reinforcing Steel (Epoxy-Coated) - Total (lbs.)					79,519

Concrete Placement Quantity

Location	Quantity
Section 1, Deck and Abutment Diaphragm	60.1
Section 2, Deck and Abutment Diaphragm	60.1
Section 3, Deck	47.2
Section 4, Deck	33.1
Section 5, Deck	33.2
Total Structural Concrete Misc. (Cubic Yards)	233.7 (F)

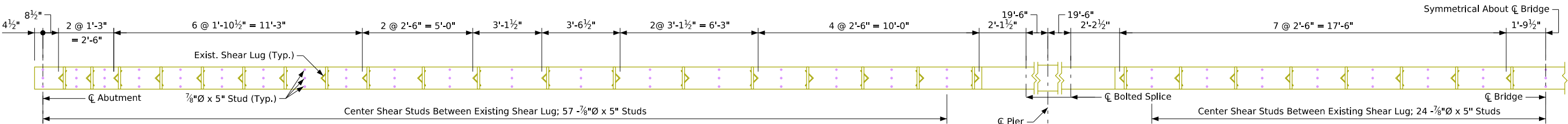
(F) - Denotes Fiber Reinforced Concrete



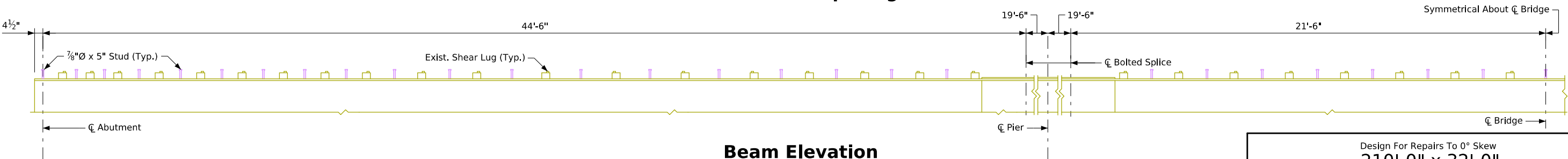
Shear Stud Detail

Note: All Studs to be 7/8"Ø

Shear Stud Spacing



Beam Elevation



Notes:

As built existing shear lug spacing may vary from construction details. Contractor to verify all dimensions in the field. See original construction drawings for details.

Welded shear studs shall be of an approved type listed in Materials I.M. 453.10, Appendix A.



Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans 82'-0" Interior Span

Superstructure Details

STA. 222+67.00 (IA 92) Turn-In Date: August 2026

Madison County

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Design No. 127 Design Sheet No. 009 of 16 FHWA No. 34810



Part Section B-B - Showing Detail B Option

Drain Notes

The drains shall be 3/8" thick steel. The drain assemblies shall be galvanized after fabrication. The bid item "Deck Drain" shall include all costs associated with fabricating and installing the deck drains as per plan.

The drain trench grates shall be ferrous castings. Metal used in the manufacture of castings shall conform to ASTM A48-83 Class 35B or better gray iron castings in accordance with current Iowa D.O.T. Standard Specifications. Finish of castings shall be smooth and free of defects. Trench grates shall be capable of carrying AASHTO HL-93 loading. Galvanizing of the trench grates is not required.

Drains shall be centered over the nearest bottom transverse deck reinforcing bar from the location designated on the situation plan. The bottom transverse deck reinforcing bar shall be cut off to provide 1" clearance from the drain. The top transverse deck reinforcing bars on each side of the drain, shall be spaced as necessary to provide 1" clearance from the drain. Longitudinal deck reinforcing bars that conflict with the drain shall be cut off to provide 2" clearance from the drain. All cut ends of bars shall be coated with epoxy patching material supplied by the Manufacturer of the epoxy coating. Longitudinal deck reinforcing bars shall be shifted as necessary to accommodate anchor bars.

Materials

Plates, bars, threaded rods and angles shall meet the requirements ASTM A709 Grade 36. The tube steel shall meet the requirements ASTM A500 Grade B.

$\frac{3}{8}$ " $\varnothing$ mechanically galvanized steel flat head screw shall meet the requirements of ASTM B695-04 (2009) and ASTM F835-12.

$\frac{3}{8}$ "Ø mechanically galvanized steel hex head bolt and hex nut shall meet the requirements of ASTM B695-04 (2009) and ASTM A307-12 Grade A.



Section C-C

Showing shim plate placement with a grate less than 10" wide. See Detail A.



Grate Tie Downs Show Both Detail A and Detail B

Side View D-D

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans

82'-0" Interior Span

Aesthetic Deck Drain Details

STA. 222+67.00 (IA 92)

Turn-in Date: August 2026

Madison County

IOWA DEPARTMENT OF TRANSPORTATION

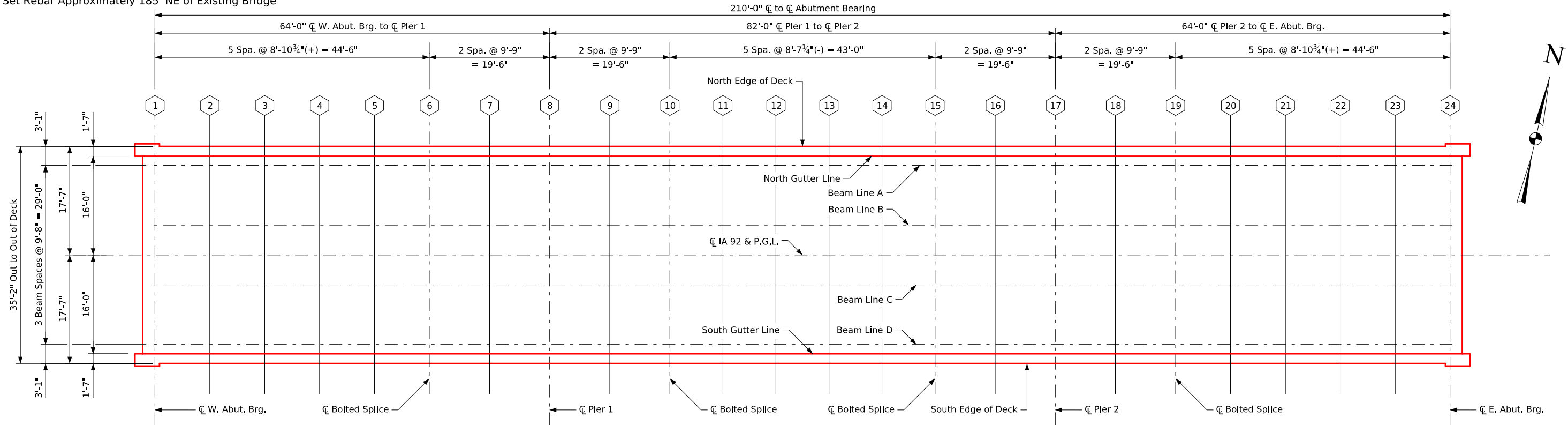
Design No. 127

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ΔΔ = Adjust shim plate according to width of grate.

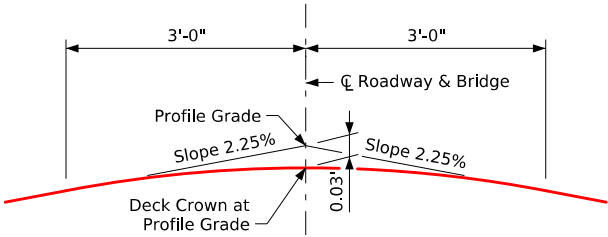
Control Point:
Northing: 7389197.086 Easting: 18363790.940 Elev. 1057.083
Set Rebar Approximately 185' NE of Existing Bridge



Top of Deck Elevation Plan

Top of Deck Elevations

Location	☐ W. Abut. Brg.					☐ Bolted Splice		C.L. Pier #1		☐ Bolted Splice		C.L. Pier #2		☐ Bolted Splice		C.L. Pier #2		☐ Bolted Splice		☐ E. Abut. Brg.					
	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12	Line 13	Line 14	Line 15	Line 16	Line 17	Line 18	Line 19	Line 20	Line 21	Line 22	Line 23	Line 24	
North Gutter Line	1065.70	1065.61	1065.53	1065.45	1065.37	1065.31	1065.24	1065.18	1065.13	1065.08	1065.05	1065.02	1064.99	1064.97	1064.96	1064.95	1064.94	1064.94	1064.95	1064.97	1064.99	1065.02	1065.05	1065.08	1065.12
Beam Line A	1065.73	1065.64	1065.56	1065.48	1065.41	1065.34	1065.27	1065.21	1065.16	1065.11	1065.08	1065.05	1065.02	1065.00	1064.99	1064.98	1064.98	1064.98	1064.99	1065.00	1065.02	1065.05	1065.08	1065.12	
Beam Line B	1065.95	1065.86	1065.78	1065.70	1065.63	1065.56	1065.49	1065.43	1065.38	1065.33	1065.30	1065.27	1065.24	1065.22	1065.21	1065.20	1065.19	1065.20	1065.21	1065.22	1065.24	1065.27	1065.30	1065.34	
☐ IA 92 & P.G.L.	1066.03	1065.94	1065.86	1065.78	1065.70	1065.64	1065.57	1065.51	1065.46	1065.41	1065.38	1065.35	1065.32	1065.30	1065.29	1065.28	1065.27	1065.27	1065.28	1065.30	1065.32	1065.35	1065.38	1065.41	
Beam Line C	1065.95	1065.86	1065.78	1065.70	1065.63	1065.56	1065.49	1065.43	1065.38	1065.33	1065.30	1065.27	1065.24	1065.22	1065.21	1065.20	1065.19	1065.20	1065.21	1065.22	1065.24	1065.27	1065.30	1065.34	
Beam Line D	1065.73	1065.64	1065.56	1065.48	1065.41	1065.34	1065.27	1065.21	1065.16	1065.11	1065.08	1065.05	1065.02	1065.00	1064.99	1064.98	1064.98	1064.98	1064.99	1065.00	1065.02	1065.05	1065.08	1065.12	
South Gutter Line	1065.70	1065.61	1065.53	1065.45	1065.37	1065.31	1065.24	1065.18	1065.13	1065.08	1065.05	1065.02	1064.99	1064.97	1064.96	1064.95	1064.94	1064.94	1064.95	1064.97	1064.99	1065.02	1065.05	1065.08	1065.12



Crown Template

No Scale



Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans82'-0" Interior Span

Top of Deck Elevations

STA. 222+67.00 (IA 92)Turn-In Date: August 2026

Madison County

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Control Point:
Northing: 7389197.086 Easting: 18363790.940 Elev. 1057.083
Set Rebar Approximately 185' NE of Existing Bridge

Deck Thickness at Beams (T)

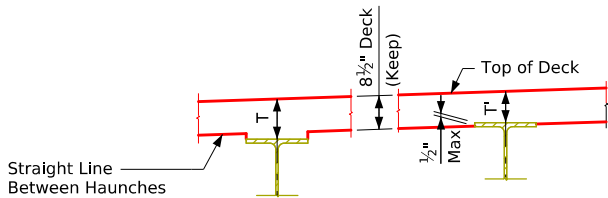
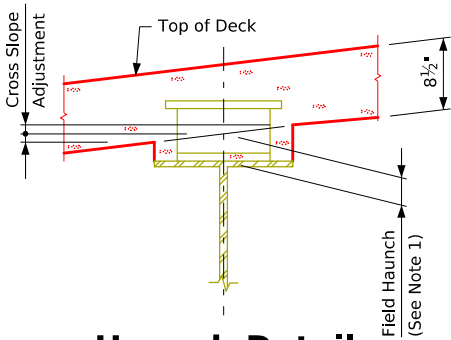
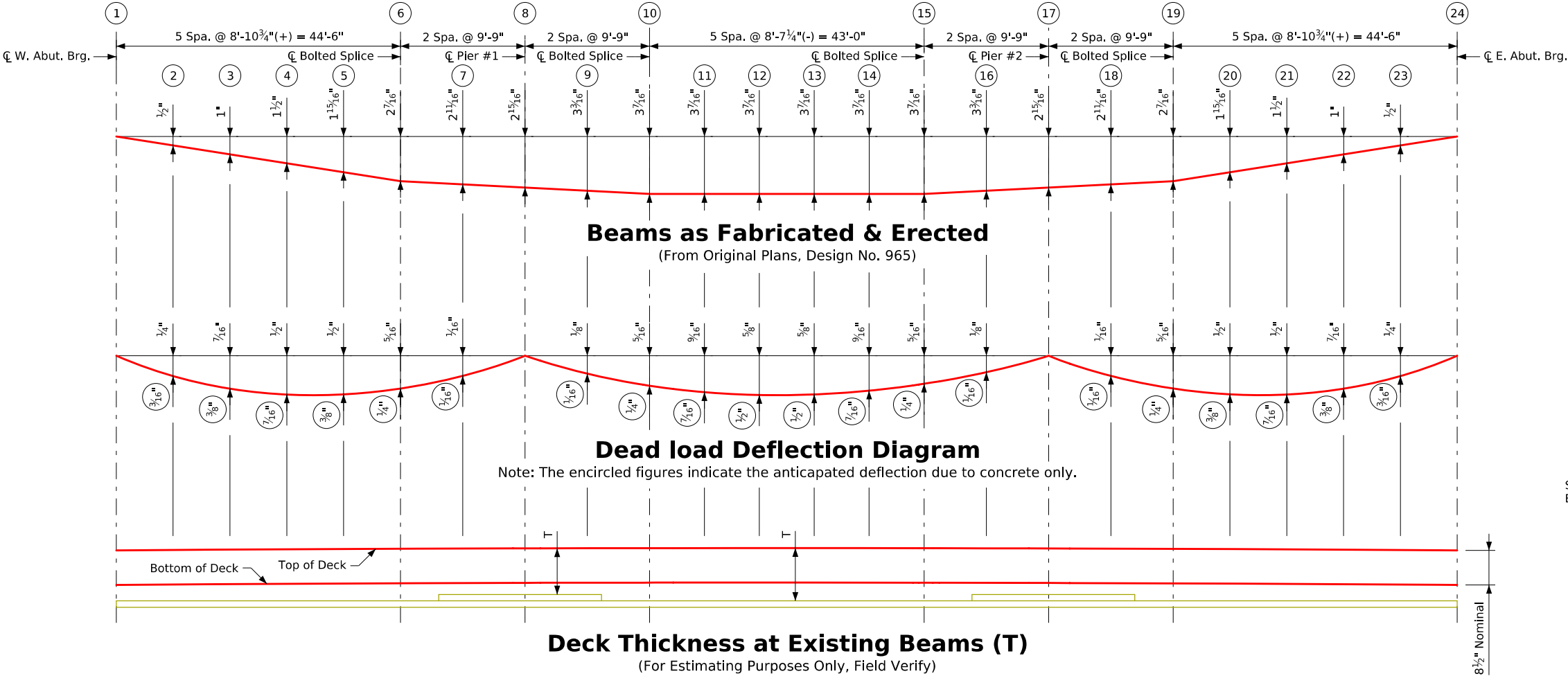
Location	℄ W. Abut. Brg.						℄ Bolted Splice						℄ Bolted Splice						℄ Bolted Splice						℄ E. Abut. Brg.
	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12	Line 13	Line 14	Line 15	Line 16	Line 17	Line 18	Line 19	Line 20	Line 21	Line 22	Line 23	Line 24	
Beam Line A	10 3/8	10 3/8	10 3/8	10 3/8	10 1/4	10 1/8	8 15/16	8 3/4	8 13/16	9 13/16	9 15/16	10	10	10	9 7/8	8 15/16	8 7/8	9	10 1/8	10 3/16	10 3/16	10 3/16	10 1/8	10 1/16	
Beam Line B	10 5/16	10 5/16	10 3/8	10 5/16	10 3/16	10 1/16	8 7/8	8 11/16	8 13/16	9 13/16	9 7/8	9 15/16	9 15/16	9 15/16	9 7/8	8 7/8	8 13/16	8 15/16	10 1/16	10 1/8	10 3/16	10 1/8	10 1/16	10	
Beam Line C	10 5/16	10 5/16	10 3/8	10 5/16	10 3/16	10 1/16	8 7/8	8 11/16	8 13/16	9 13/16	9 7/8	9 15/16	9 15/16	9 15/16	9 7/8	8 7/8	8 13/16	8 15/16	10 1/16	10 1/8	10 3/16	10 1/8	10 1/16	10	
Beam Line D	10 3/8	10 3/8	10 3/8	10 3/8	10 1/4	10 1/8	8 15/16	8 3/4	8 13/16	9 13/16	9 15/16	10	10	10	9 7/8	8 15/16	8 7/8	9	10 1/8	10 3/16	10 3/16	10 3/16	10 1/8	10 1/16	

Table of Beam Line Deck Haunch Elevations

Location	℄ W. Abut. Brg.						℄ Bolted Splice						℄ Bolted Splice						℄ Bolted Splice						℄ E. Abut. Brg.
	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12	Line 13	Line 14	Line 15	Line 16	Line 17	Line 18	Line 19	Line 20	Line 21	Line 22	Line 23	Line 24	
Beam Line A	1065.02	1064.95	1064.88	1064.81	1064.73	1064.66	1064.57	1064.51	1064.46	1064.43	1064.41	1064.38	1064.36	1064.33	1064.30	1064.28	1064.27	1064.28	1064.30	1064.33	1064.35	1064.37	1064.39	1064.41	
Beam Line B	1065.24	1065.17	1065.10	1065.03	1064.95	1064.87	1064.79	1064.72	1064.68	1064.65	1064.62	1064.60	1064.57	1064.55	1064.52	1064.49	1064.48	1064.49	1064.52	1064.54	1064.57	1064.59	1064.61	1064.63	
Beam Line C	1065.24	1065.17	1065.10	1065.03	1064.95	1064.87	1064.79	1064.72	1064.68	1064.65	1064.62	1064.60	1064.57	1064.55	1064.52	1064.49	1064.48	1064.49	1064.52	1064.54	1064.57	1064.59	1064.61	1064.63	
Beam Line D	1065.02	1064.95	1064.88	1064.81	1064.73	1064.66	1064.57	1064.51	1064.46	1064.43	1064.41	1064.38	1064.36	1064.33	1064.30	1064.28	1064.27	1064.28	1064.30	1064.33	1064.35	1064.37	1064.39	1064.41	

Miscellaneous Data Table

Miscellaneous Data Table																											
Location	Beam Line		℄ W. Abut. Brg.						℄ Bolted Splice						℄ Bolted Splice						℄ Bolted Splice						℄ E. Abut. Brg.
			Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12	Line 13	Line 14	Line 15	Line 16	Line 17	Line 18	Line 19	Line 20	Line 21	Line 22	Line 23	Line 24	
Anticipated Deflection Due to Deck (in.)	All		0	3/16	3/8	7/16	3/8	1/4	1/16	0	1/16	1/4	7/16	1/2	1/2	7/16	1/4	1/16	0	1/16	1/4	3/8	7/16	3/8	3/16	0	
Cross Slope Adjustment (in.)	All																										
Allowable Field Haunch (in. & ft.)	Max	All	3 (0.25)					2 (0.167)					1/8 +/- 3 (0.25)					2 (0.167)					3(0.25)				
	Min	All	-3/8 (-0.031)																								



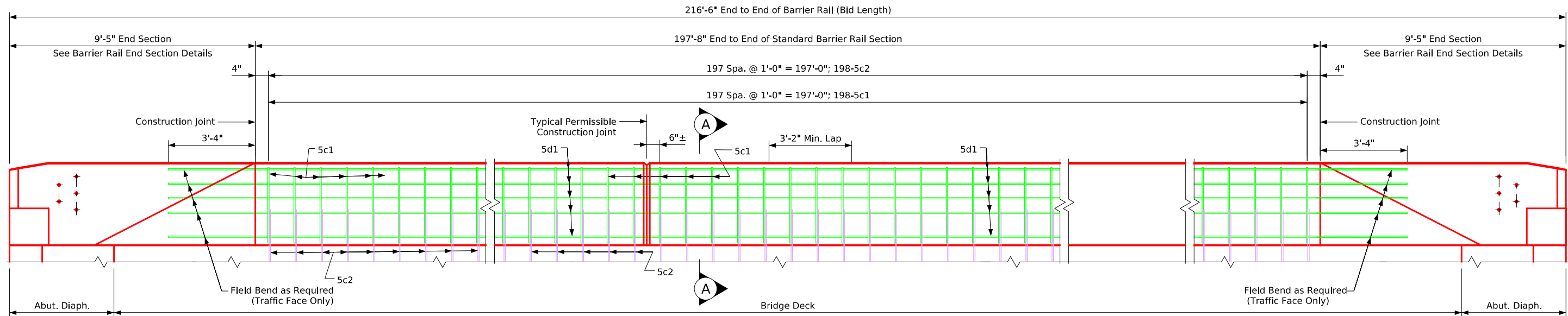
Note: The deck thickness (T) at beams is estimated based on proposed top of deck elevations and anticipated beam camber and deflection data from existing plans. These deck haunch thickness values are estimates and not guaranteed for construction.

Note:
Survey and original plan data were used to determine existing top of beam elevations. Theoretical camber and beam deflections are based on existing plan data. The proposed top of deck elevations will provide a theoretical beam haunch within design parameters. Field haunches are determined using surveyed top of beam elevations and "Beam Line Haunch Elevation" data. Allowable maximum and minimum "Field Haunch" values are given in inches and decimals of feet in the "Miscellaneous Data" table. "Cross Slope Adjustment" values will aid the Contractor in determining actual formed haunch dimensions at the edges of the top flange.

Note 1:
To calculate field haunch required at each location, survey the beam tops consistent with the spacings shown on the "Top of Deck Elevation Plan". Subtract the surveyed beam shot from the "Beam Line Haunch Elevation". This value will be the haunch needed (see "Field Haunch" in haunch detail.) The "Beam Line Haunch Elevation" includes adjustments for deck thicknesses and anticipated deflections. No additional calculations are required. If the field haunch exceeds the maximums and minimums shown in inches and decimals of feet in the Miscellaneous Data Table, adjustments to the grade or additional haunch reinforcement will be required.

NOTE:
HAUNCH LOCATIONS ARE AT THE SAME LOCATION AS THE ENCIRCLED LETTERS AND NUMBERS SHOWN ON TOP OF DECK ELEVATIONS SHEET.

Design For Repairs To 0° Skew
210'-0" x 32'-0"
Continuous I-Beam Bridge
64'-0" End Spans 82'-0" Interior Span
Deck Haunch Details
STA. 222+67.00 (IA 92) Turn-in Date: August 2026
Madison County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 127 Design Sheet No. 012 of 16 FHWA No. 34810



Elevation of Barrier Rail

Barrier Rail Notes:

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

The permissible construction joints are to be placed between vertical bars at a minimum spacing of 20 feet. Construction joint contact surfaces are to be coated with an approved bond breaker.

Cost of the joint sealer and bond breaker shall be considered incidental to other construction.

All barrier rail reinforcing steel is to be either epoxy coated or stainless steel as shown. The stainless steel reinforcing steel shall be deformed bar grade 60 meeting the requirements of Construction and Materials I.M. 452.

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

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

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

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

Cross sectional area of the Standard Sections of the barrier rail = 3.50 square feet.

Epoxy Coated Reinf. Steel - Two Rails

Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c1	Rail, Vertical		396	6'-8"	2,754
	5d1	Rail, Longitudinal		108	36'-9"	4,140
Epoxy Reinf. Total Weight (lbs.)						6,894

Stainless Steel Reinf. Steel - Two Rails

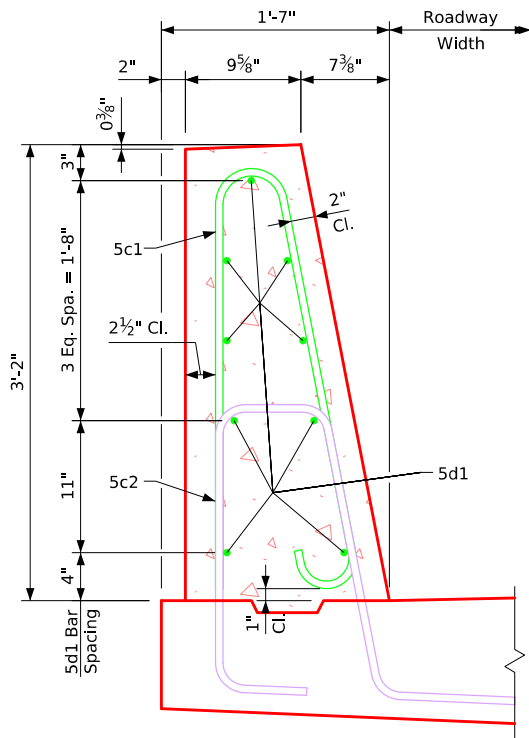
Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c2	Rail, Vertical		396	7'-8"	3,167
Stainless Steel Reinf. Total Weight (lbs.)						3,167

Concrete Placement Summary

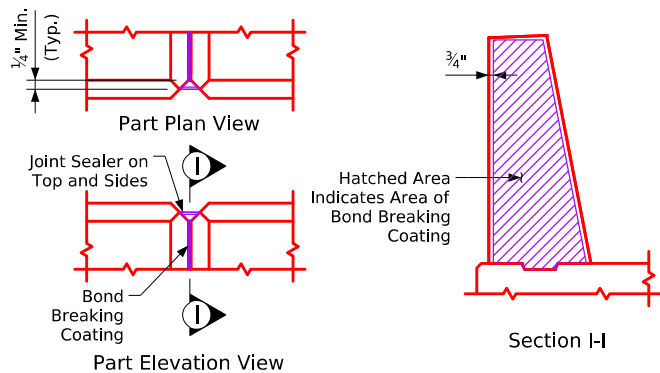
Section	Total
Standard Section 395'-4" at 0.130 cu. yd. per ft.	51.4
Total (cu. yd.)	51.4

Concrete Barrier Rail Quantities

Item	Unit	Quantity
Concrete Barrier Railing	L.F.	433.0

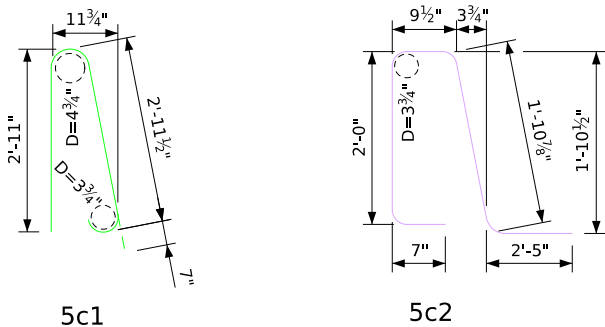


Part Section A-A



Barrier Rail Joint Details

Bent Bar Details



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

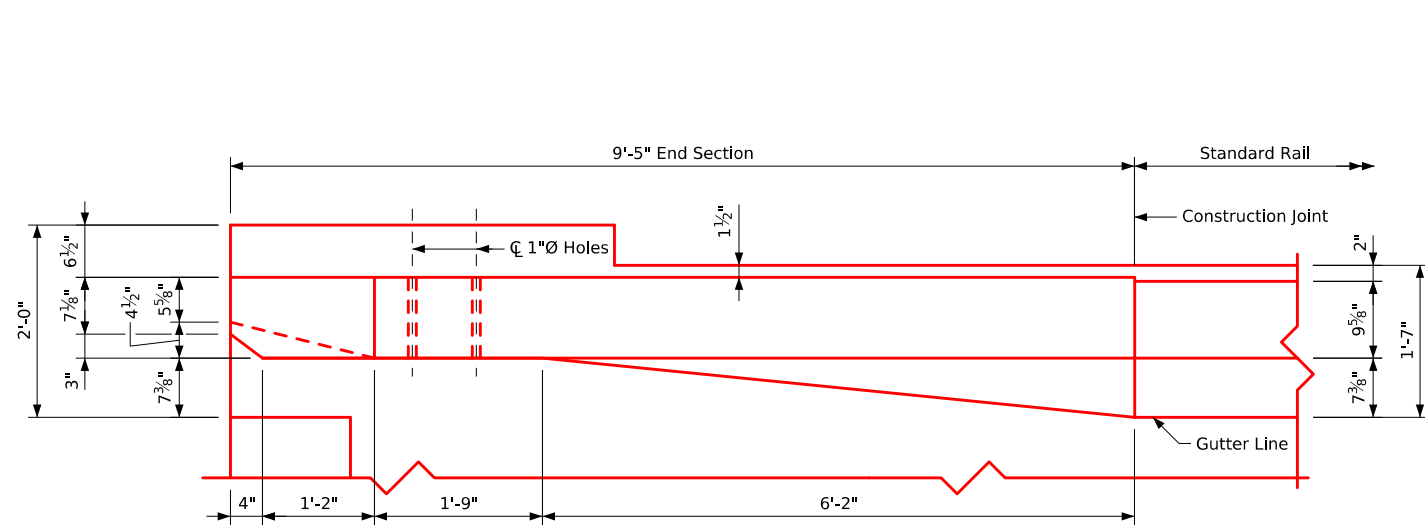
Design For Repairs To 0° Skew
210'-0" x 32'-0"
Continuous I-Beam Bridge

64'-0" End Spans
82'-0" Interior Span
Barrier Rail Details
STA. 222+67.00 (IA 92)
Turn-In Date: August 2026

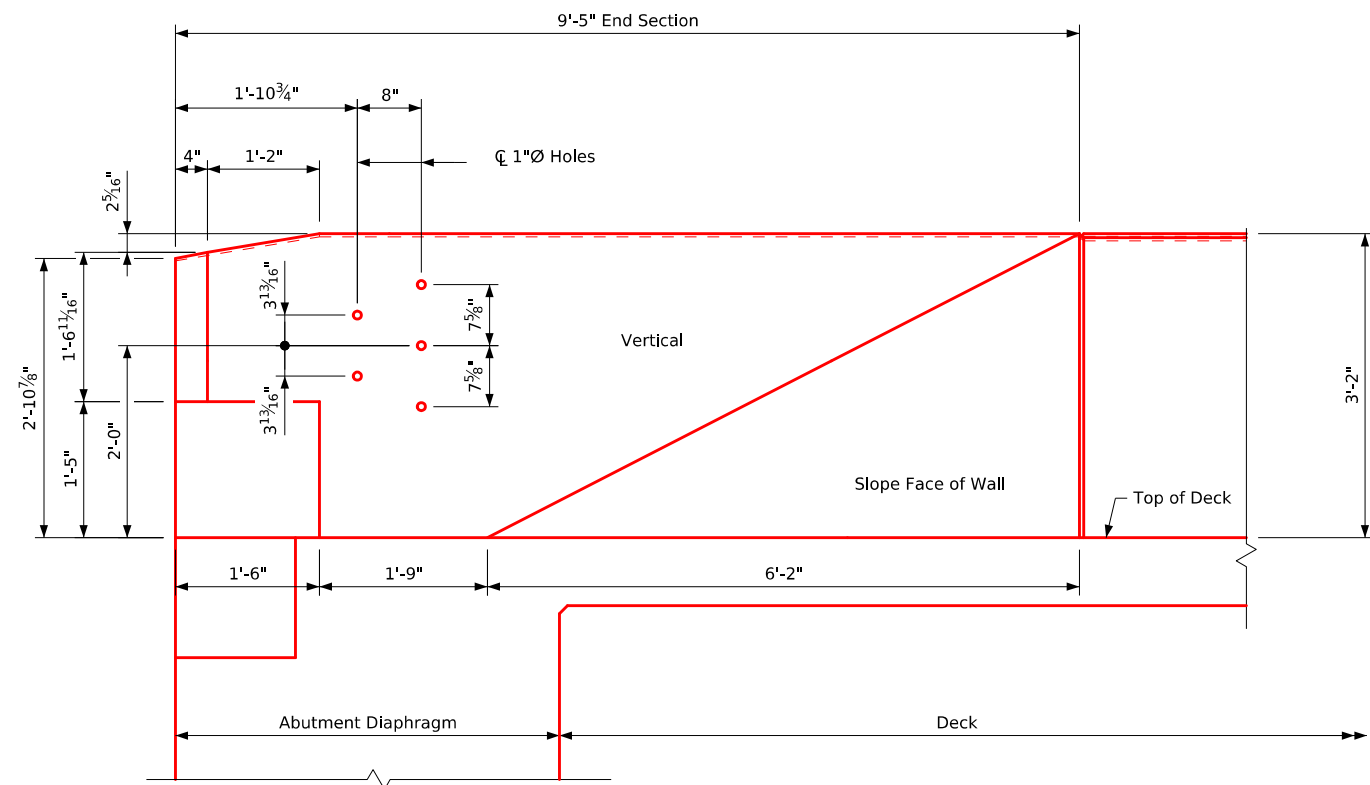
Madison County

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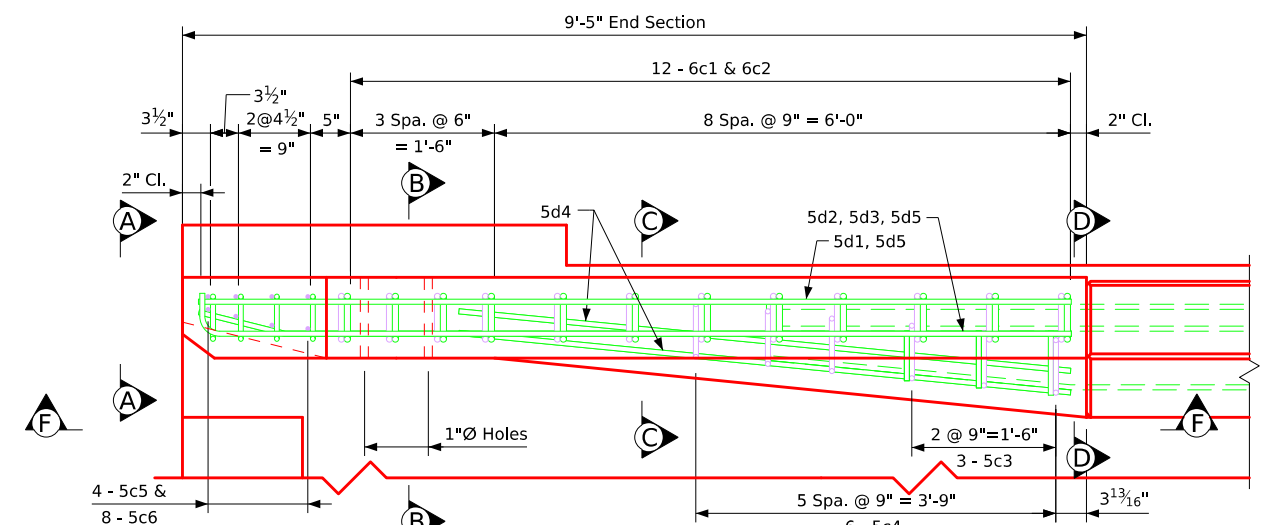
Part Plan View



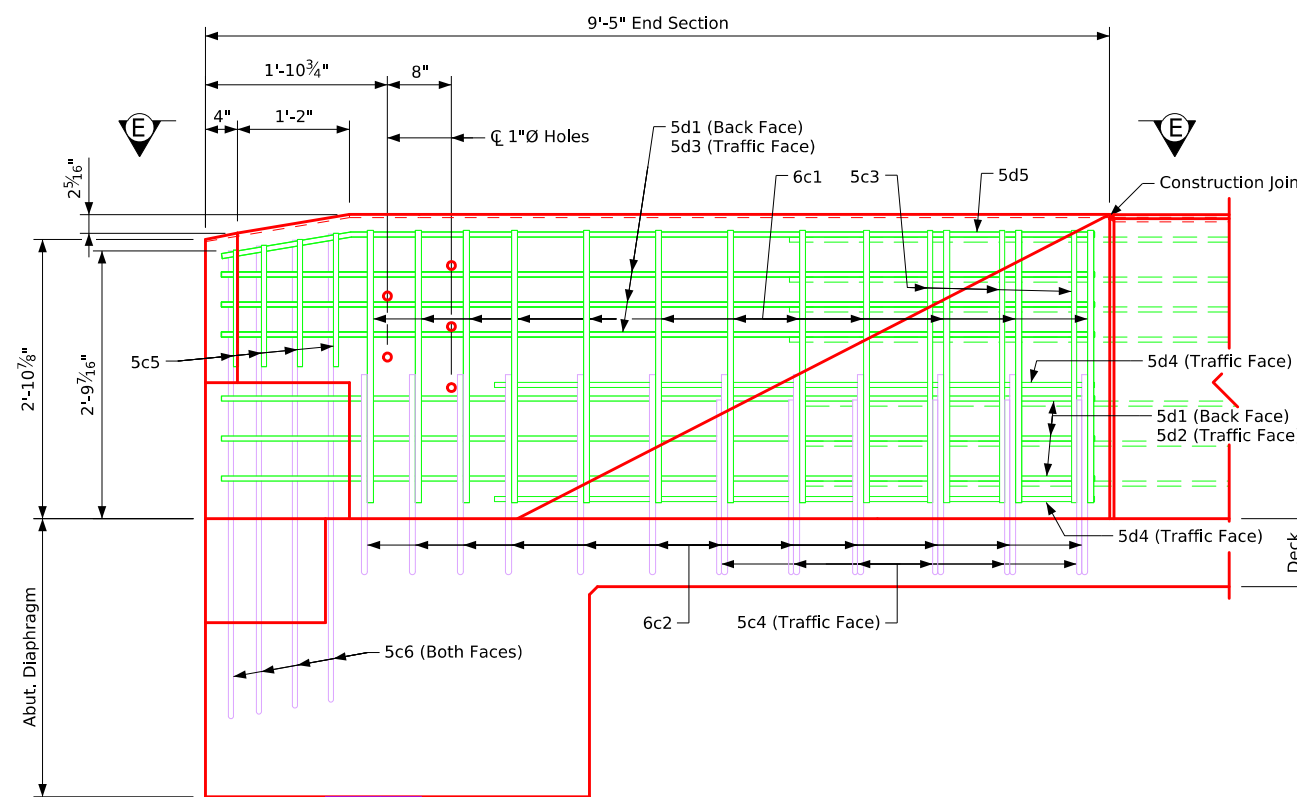
Part Elevation View

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

Notes:
The 6c2, 5c4, and 5c6, bars are to be placed with the abutment diaphragm and deck.
For Bar List, Bent Bar Details, View A-A, Sections B-B, C-C, and D-D see Design Sheet No. 15.



Part View E-E



Part View F-F

Abutment Diaphragm and Deck Reinforcing Not Shown for Clarity

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans 82'-0" Interior Span

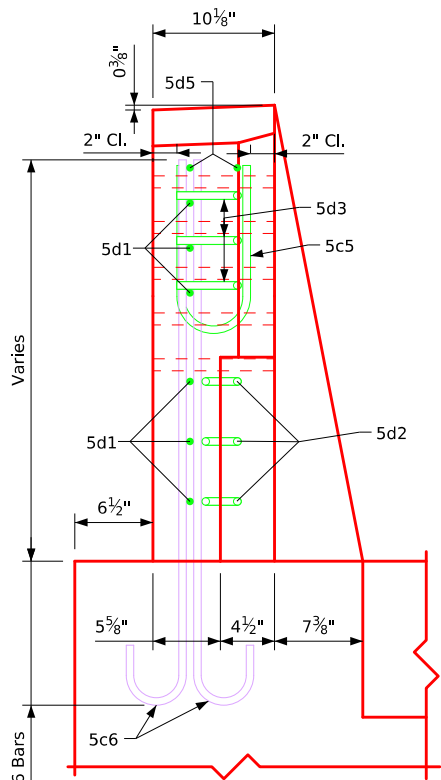
Barrier Rail End Section

STA. 222+67.00 (IA 92) Turn-In Date: August 2026

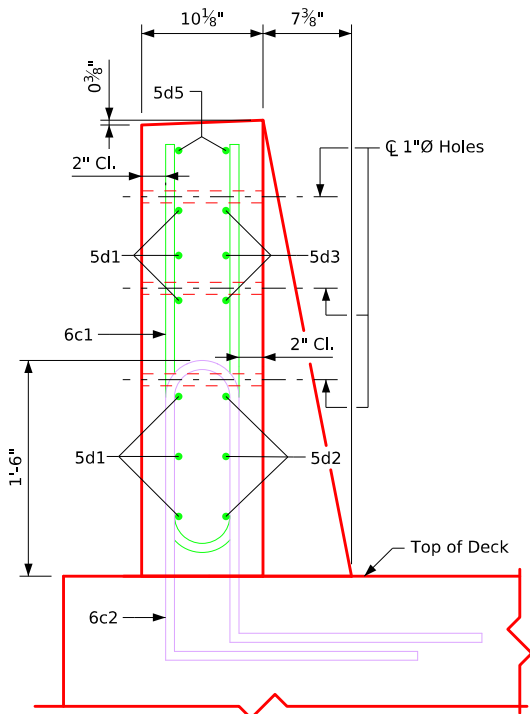
Madison County

IOWA DEPARTMENT OF TRANSPORTATION

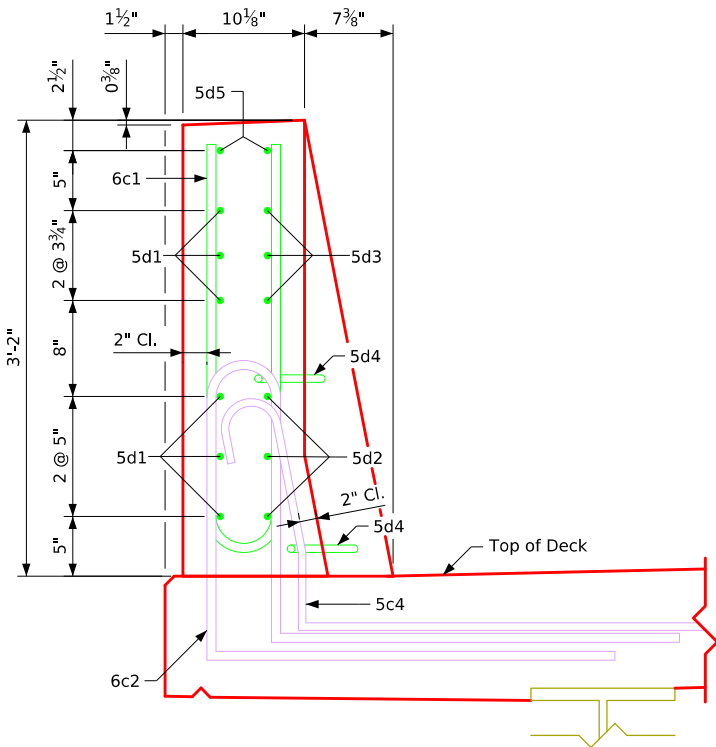
Design No. 127 Design Sheet No. 014 of 16 FHWA No. 34810



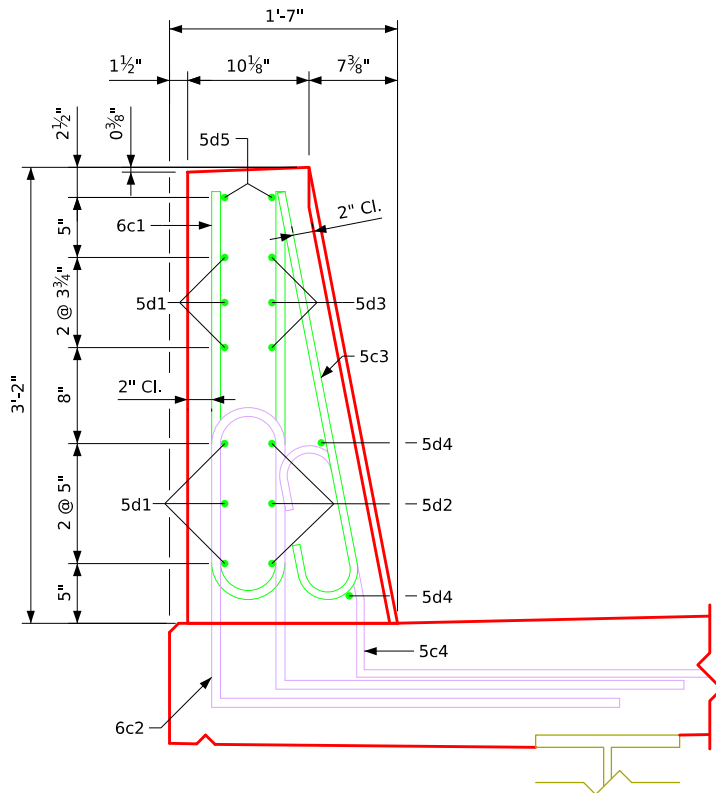
View A-A



Section B-B



Section C-C



Section D-D

Deck and abutment diaphragm bars in View A-A, Sections B-B, C-C, & D-D are not shown for clarity.

Notes:
The 6c2, 5c4, and 5c6 bars are to be placed with the deck and abutment diaphragm.
For Plan and Elevation see Design Sheet No. 14.



Epoxy Coated Reinforcing Steel - One End Section

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

Reinforcing Steel (Epoxy-Coated) - Total (lbs.) 279

Stainless Steel Reinforcing Steel - One End Section

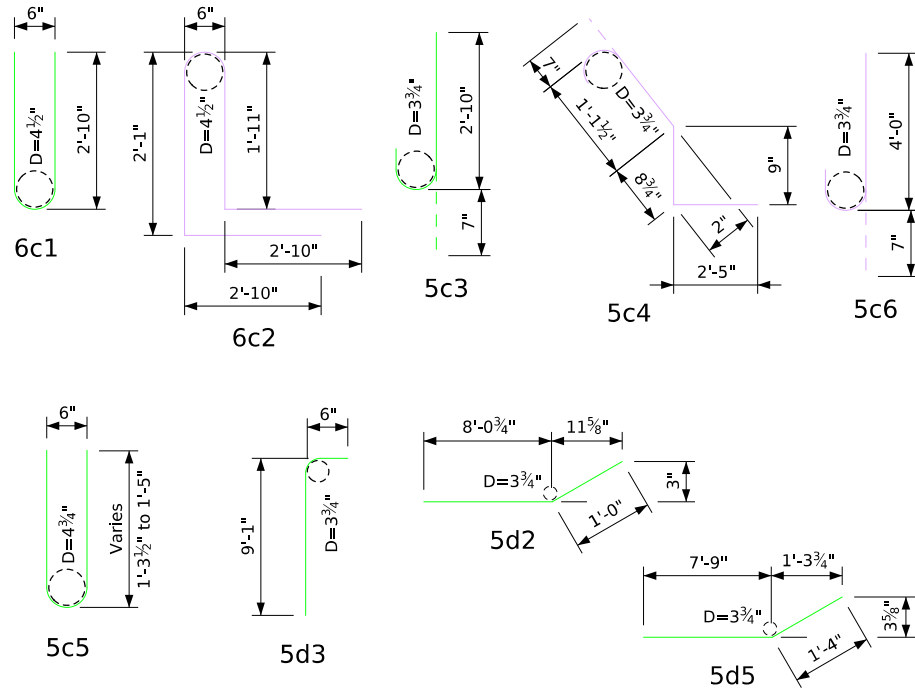
Bar	Location	Shape	No.	Length	Weight
6c2	Rail, Vertical		12	10'-2"	183
5c4	Rail, Vertical (Traffic Face)		6	4'-11"	31
5c6	Rail, Vertical (End)		8	4'-7"	38

Reinforcing Steel (Stainless Steel) - Total (lbs.) 252

Concrete Placement Summary - One End Section

Section	Total
Barrier Rail, One End Section	1.0 Cu. Yd.

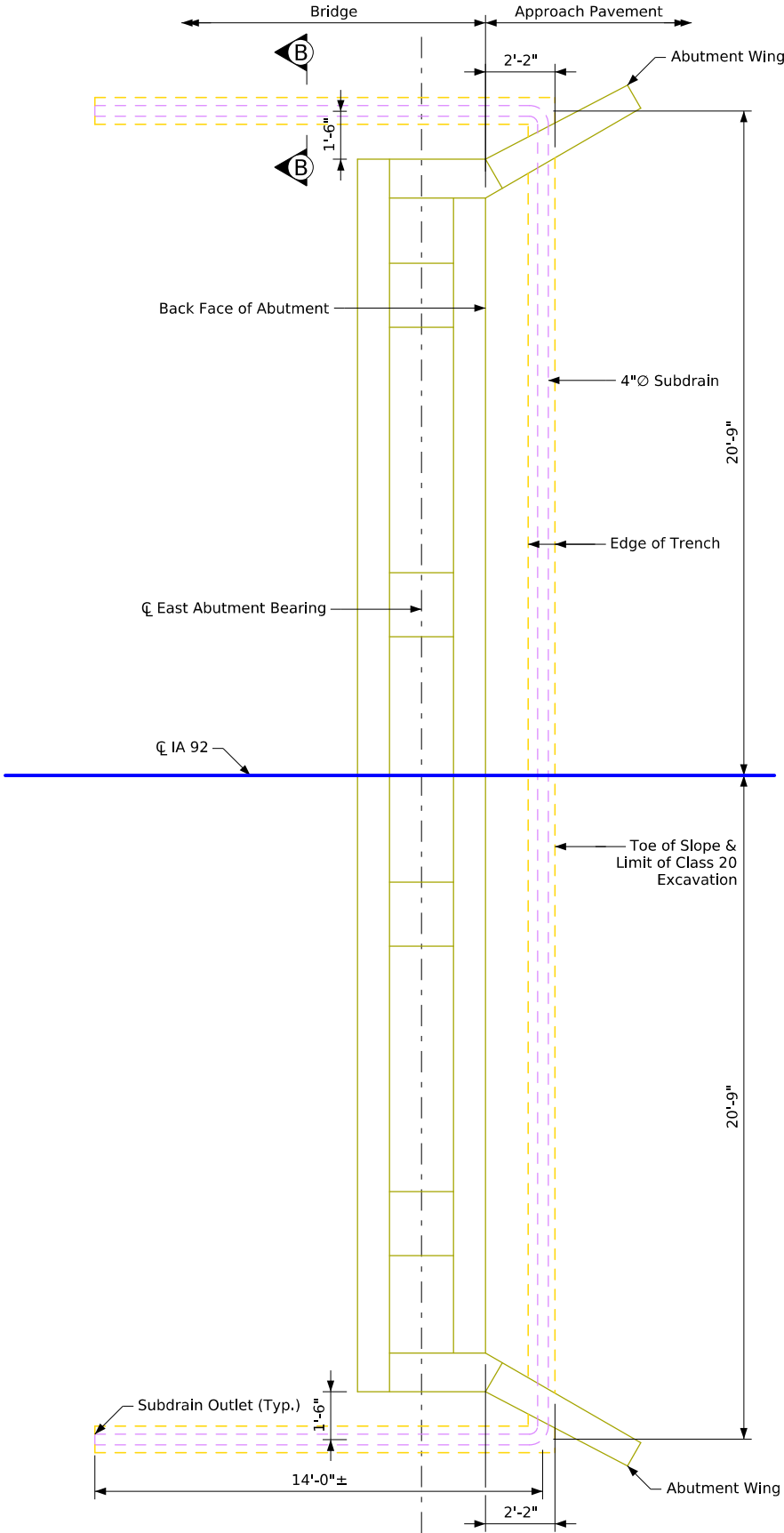
Bent Bar Details



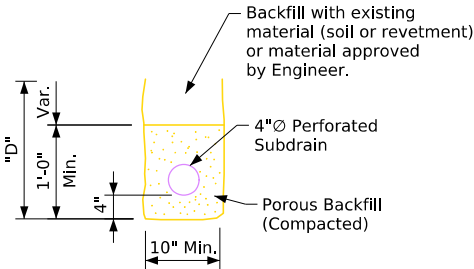
Note: All dimensions are out to out. D = Pin Diameter

Design For Repairs To 0° Skew
210'-0" x 32'-0"
Continuous I-Beam Bridge
64'-0" End Spans 82'-0" Interior Span
Barrier Rail End Section
STA. 222+67.00 (IA 92) Turn-In Date: August 2026
Madison County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 127 Design Sheet No. 015 of 16 FHWA No. 34810

Control Point:
Northing: 7389197.086 Easting: 18363790.940 Elev. 1057.083
Set Rebar Approximately 185' NE of Existing Bridge

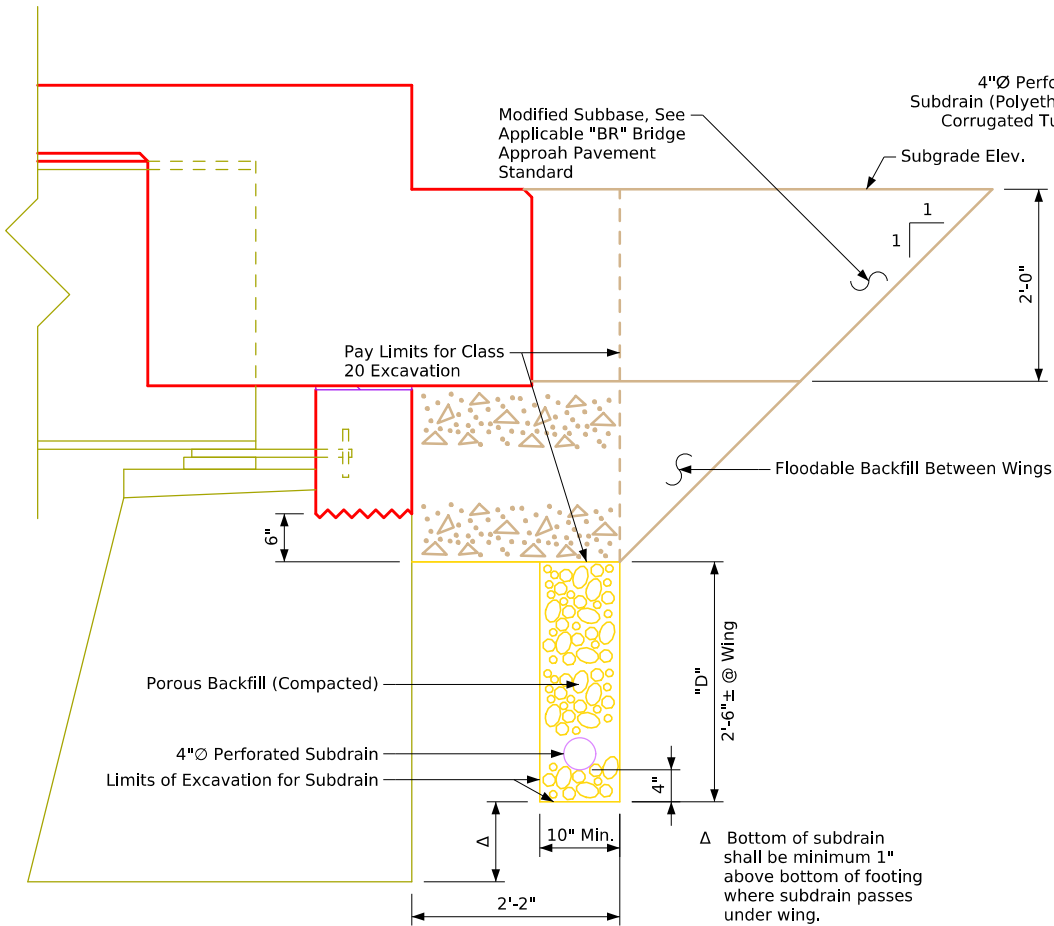


East Abutment Plan



Section B-B

"D" = Depth required to provide proper flow line for subdrain.



Abutment Backfill Detail

"D" = Depth required to provide proper flow line for subdrain.

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

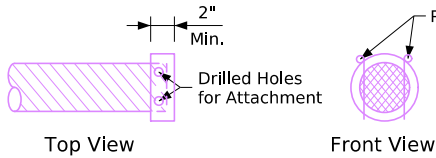
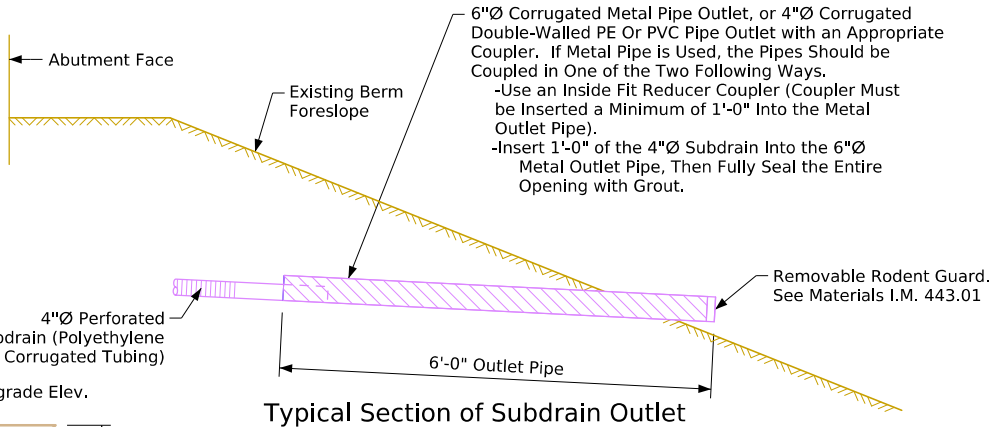
The subdrain outlet shall consist of 6'-0" length of pipe with a removable rodent guard as detailed on this sheet.

The cost of furnishing and placing subdrain (including excavation for subdrain trench), porous backfill, and subdrain outlet is to be included in the price bid for "Subdrain, Standard, Perforated, 4in., As Per Plan". No extra payment will be made.

The cost of furnishing and placing floodable backfill is to be included in the price bid for "Excavation, Class 20".

The dimensions shown for the proposed subdrains are based on the grading layout on the original plans. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to variances in the field.

Subdrain shall slope downward 2% from CL approach roadway.



Removable Rodent Guard Details
Outlet Details

Subdrain Outlet Elevations

Location	Elevation
West Abutment	1057.2
East Abutment	1056.7

Design For Repairs To 0° Skew

210'-0" x 32'-0"

Continuous I-Beam Bridge

64'-0" End Spans82'-0" Interior Span

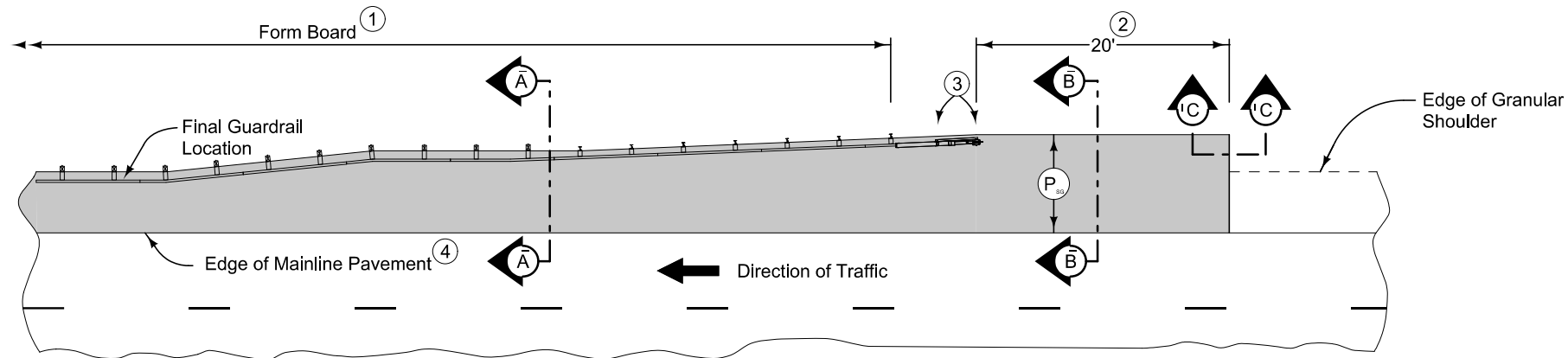
Subdrain Details

STA. 222+67.00 (IA 92)Turn-in Date: August 2026

Madison County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127Design Sheet No. 016 of 16FHWA No. 34810



PLAN VIEW

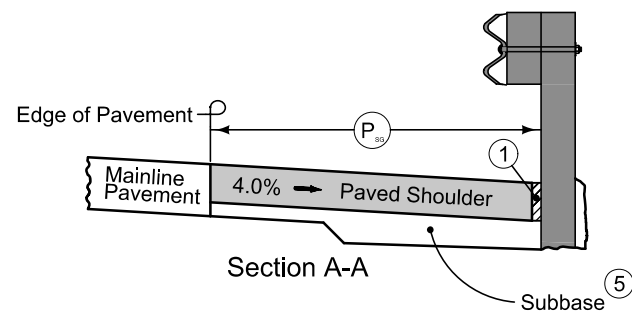
9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at $P/2$ from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

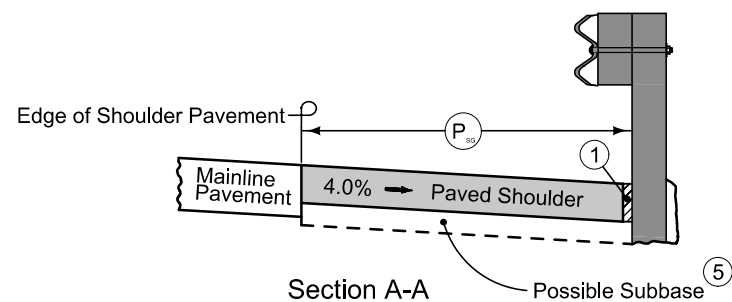
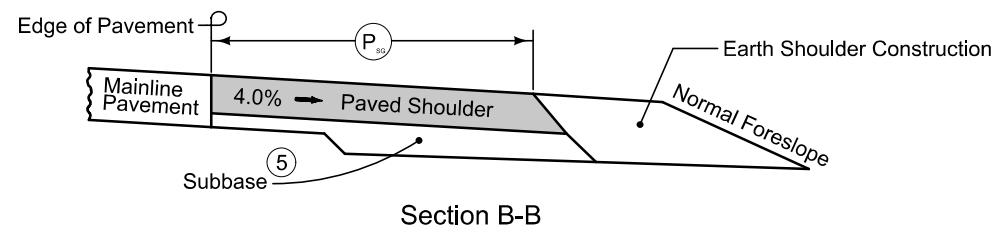
Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

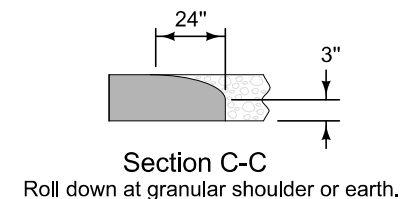
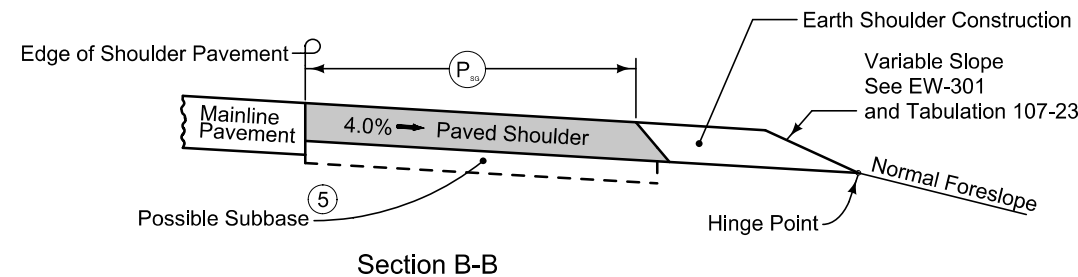
- ① PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown.
- ② Continue paved shoulder 20 feet beyond the center of the first post.
- ③ Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ④ 'BT' joint (per PV-101) for PCC shoulder. 'B' joint (per PV-101) for HMA shoulder.
- ⑤ Refer to other details in the plan.



NEW CONSTRUCTION



EXISTING SHOULDER



PAVED SHOULDER AT GUARDRAIL
(GRANULAR SHOULDER ADJACENT TO MAINLINE)

ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Roadway Items : Roadway Items

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
1	2102-0425070	SPECIAL BACKFILL	TON	75.18	Item is for paved shoulder construction. Refer to Typical 7156 on Sheet B.1 and Tab. 112-9 in the C Sheets for details. Bid item quantity is increased by 5% for irregularities.
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	51.1	Provide borrow material according to Section 2102 of the Standard Specifications. Refer to Tab. 107-23. Material is available on site from excavation for bridge approach construction.
3	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	176.9	Includes 176.9 cu. yds. for steel beam guardrail installation at all four bridge corners. Refer to Tab. 107-23 in the C Sheets. Unsuitable B or C material can be used. CUT = 176.9 CY FILL+30% = 228.0 CY
4	2102-2713090	EXCAVATION, CLASS 13, WASTE	CY	23.6	Item is for the removal of existing granular shoulder. Refer to Tab. 112-9 in the C Sheets for details. Dispose of excess material according to Article 1106.07 of the current specifications.
5	2121-7425020	GRANULAR SHOULDERS, TYPE B	TON	1.96	Item is for replacing existing paved shoulders not covered by new paved shoulders. Refer to Sheet D.2 and Tab. 112-9 in the C Sheets for details.
6	2122-5500090	PAVED SHOULDER, HOT MIX ASPHALT MIXTURE, 9 IN.	SY	192.3	Item is for paved shoulders adjacent to steel beam guardrail installation. See Detail 7156 on Sheet B.1 and Tab. 112-9 in the C Sheets for details.
7	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	5.91	Includes 5.91 Sta. of 3.7 ft wide shoulders on mainline. Requires a minimum of 4 inches of topsoil. Place according to Article 2105.03,B of the Standard Specifications.
8	2301-0690203	BRIDGE APPROACH, BR-203	SY	548.2	See Tab. 112-6 in the C Sheets.
9	2412-0000100	LONGITUDINAL GROOVING IN CONCRETE, BRIDGE DECK	SY	686.3	See Tab. 100-28 in the C Sheets.
10	2503-0500402	BRIDGE END DRAIN, DR-402	EACH	4	See Tab. 104-8A in the C Sheets.
11	2505-4008120	REMOVAL OF STEEL BEAM GUARDRAIL	LF	454.4	See Sheet U.1 and Tab. 110-7A in the C Sheets.
12	2505-4008300	STEEL BEAM GUARDRAIL	LF	150	See Tab. 108-8A in the C Sheets.
13	2505-4008410	STEEL BEAM GUARDRAIL BARRIER TRANSITION SECTION, BA-201	EACH	4	
14	2505-4021010	STEEL BEAM GUARDRAIL END ANCHOR, BOLTED	EACH	4	
15	2505-4021720	STEEL BEAM GUARDRAIL TANGENT END TERMINAL, BA-205	EACH	4	
16	2510-6745850	REMOVAL OF PAVEMENT	SY	615.5	See Tab. 110-1 and Tab. 102-5 in the C Sheets for existing pavement information.

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
17	2524-6765010	REMOVE AND REINSTALL SIGN AS PER PLAN	EACH	2	Refer to Tab. 190-61 in the C Sheets. The Contractor shall remove each sign and the hardware used to secure the sign to another sign, posts, or sign support structure. For signs mounted directly to posts, removal of the sign shall include removal of the posts. Posts may be either wood posts or steel breakaway sign posts. The removal of concrete footings for steel breakaway sign posts will be measured and paid for separately. Holes remaining from the removal of wood posts shall be backfilled with suitable earth to the original level or to the natural ground surface in accordance with Article 2402.09 of the Standard Specifications. All steel posts removed shall become the property of the Contractor. Unless otherwise noted, wood posts removed shall remain the property of DOT. The Contractor shall deliver the wood posts to a DOT storage area within 50 miles, as designated by the Engineer. The existing sign shall be removed and stored. The Contractor shall remove the sign and transport it to a DOT storage area within 50 miles, as designated by the Engineer. The Contractor shall transport the sign back to the job site when ready for reinstallation. The Contractor shall furnish all necessary hardware to install the signs. When the new installation is similar to the original installation, unless otherwise noted, the existing hardware may be used to reinstall the sign. Signs damaged by the Contractor's activities shall be replaced at the Contractor's expense. Replacement materials shall be new. The DOT will furnish all details necessary for fabrication of the replacement materials. METHOD OF MEASUREMENT: The Engineer will count each sign removed and reinstalled. BASIS OF PAYMENT: For each sign removed and reinstalled, the Contractor shall be paid the contract unit price.
18	2524-9276010	PERFORATED SQUARE STEEL TUBE POSTS	LF	26	See Tab. 190-51 in the C Sheets for locations and details.
19	2524-9276021	PERFORATED SQUARE STEEL TUBE POST ANCHOR, BREAK-AWAY SOIL INSTALLATION	EACH	2	
20	2527-9263209	PAINTED PAVEMENT MARKINGS, WATERBORNE OR SOLVENT-BASED	STA	11.51	See Tab. 108-22 in the C Sheets.
21	2528-2518000	SAFETY CLOSURE	EACH	2	See Tab. 108-13A in the C Sheets.
22	2528-8445110	TRAFFIC CONTROL	LS	1	Refer to Traffic Control Plan on Sheet J.1.
23	2557-0000100	LONGITUDINAL GROOVING IN CONCRETE, PAVEMENT	SY	497.4	See Tab. 100-28 in the C Sheets.
24	2602-0000312	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 12 IN. DIA.	LF	790	Refer to Tab. 100-19 in the C Sheets. The tabulation includes estimated locations for placement of "Perimeter and Slope Sediment Control Device, 12 in. dia." to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements.
25	2602-0000351	REMOVAL OF PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE	LF	790	See Tab. 100-19 in the C Sheets. This item is for perimeter and slope sediment control device removal for replacement (replacement to be paid for separately), or for areas that have achieved 70% permanent growth. Bid item is estimated at 100% of the Perimeter and Slope Sediment Control Device, 12IN. bid item quantity.

100_01D
8/15/22

PROJECT DESCRIPTION

This project is for deck and rail repair on the IA 92 bridge over the Middle River. It will also involve replacement of the bridge approaches, paving notches, guardrail, and paved shoulder at guardrail.

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE Possible Standards: EC-204 100_19 10/15/24							
Line No.	Station From	Station To	Side	Sediment Control Device Type	Diameter Size	Length (LF)	Remarks
1.0	219+88.80	221+58.87	Right	Perimeter and Slope	12 inch	180.00	
2.0	223+79.74	224+62.38	Right	Perimeter and Slope	12 inch	90.00	
3.0	224+58.95	224+95.69	Right	Perimeter and Slope	12 inch	40.00	
4.0	220+38.73	221+58.84	Left	Perimeter and Slope	12 inch	130.00	
5.0	223+75.18	224+31.33	Left	Perimeter and Slope	12 inch	70.00	
6.0	224+29.68	225+45.32	Left	Perimeter and Slope	12 inch	120.00	
7.0	+.00					160.00	+25% For Maintenance
Total:						790	

LONGITUDINAL GROOVING				100_28 8/15/22
Line No.	Location	Total (SY)	Remarks	
1.0	222+67.00	248.7	West Approach	
2.0	222+67.00	686.3	Bridge deck	
3.0	222+67.00	248.7	East Approach	
Total:		1183.7		

EXISTING PAVEMENT																					102_05 9/29/23
Line No.	County	Route	Direction of Travel	Begin Ref. Location Sign	End Ref. Location Sign	Year	Type	Project Number	Surface Type	Surface Depth (IN)	Base Type	Base Depth (IN)	Subbase Type	Subbase Depth (IN)	Removal Type	Removal Depth (IN)	Coarse Aggregate Source	Coarse Aggregate Type	Course Aggregate Durability Class	Reinforcement Type	Remarks
1.0	Madison	IA 92	Both			2014		STPN-092-3(33)--2J-01	HMA	1.5	HMA	1.5	CIP	3.0	MIL	4.5					RUBBLIZED & 3IN CHOKE STONE
2.0	Madison	IA 92	Both			2014	W	STPN-092-3(33)--2J-01	HMA	1.5	HMA	1.5	CIP	3.0	MIL	3.0					10IN MACADAM STONE
3.0	Madison	IA 92	Both			1991		FN-92-4(16) - -21-61	AAC	2.0	BAC	2.5					STANZEL	C. LST.			
4.0	Madison	IA 92	Both			1967		F-92-4(1) - -20-61	PCC	9.0							EARLY CHAPPEL	C. LST.	1		

SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN											104_08A 8/15/22
Refer to Standard Road Plan DR-401 and DR-402											
Line No.	Bridge Station	Bridge Corner	Distance DI-1 or DI-2 (FT)	Bridge End Drain Type	Special Ditch Control, Wood Excelsior Mat EC-101 (SQ)	Turf Reinforced Mat (TRM) Type 2 EC-104 (SQ)	Transition Mat EC-105 (SF)	Macadam Stone Base (TONS)	Engineering Fabric (SY)	Erosion Stone (TON)	Remarks
1.0	222+67.00	SW	33.1	DR-402				1.463	28.2	15.300	
2.0	222+67.00	SE	33.1	DR-402				1.463	67.8	43.200	
3.0	222+67.00	NW	33.1	DR-402				1.463	29.5	16.200	
4.0	222+67.00	NE	33.1	DR-402				1.463	70.4	45.000	
Total:								5.852	195.9	119.7	

105_04
4/21/26

STANDARDS

The following Standards apply to construction work on this project.

Number	Date	Title
BA-200	04-21-26	Steel Beam Guardrail Components
BA-201	10-18-22	Steel Beam Guardrail Barrier Transition Section (MASH TL-3)
BA-202	04-15-25	Steel Beam Guardrail Bolted End Anchor
BA-205	10-17-23	Steel Beam Guardrail Tangent End Terminal (MASH TL-3)
BA-211	04-15-25	Steel Beam Guardrail Long - Span System for Post Conflicts
BA-250	10-21-25	Steel Beam Guardrail Installation at Concrete Barrier or Bridge End Post (MASH TL-3)
BR-203	04-21-26	Double Reinforced 12in Approach
BR-211	04-21-26	Bridge Approach (Abutting PCC or Composite Pavement)
DR-306	10-17-23	Precast Concrete Headwall for Subdrain Outlets
DR-402	04-16-24	Rock Flume for Bridge End Drain
EC-204	10-19-21	Perimeter, Slope and Ditch Check Sediment Control Devices
EC-502	04-21-15	Seeding in Rural Areas
EW-301	04-16-24	Guardrail Grading
PM-110	10-15-24	Line Types
PV-101	10-21-25	Joints
SI-101	04-19-16	Locations - Type 'A' Signs
SI-131	10-18-16	Installation - Type 'A' Signs
SI-173	04-19-16	Object Markers
SI-211	10-18-22	Object Marker and Delineator Placement with Guardrail
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-252	10-21-25	Routes Closed to Traffic

107_23
8/15/22

GRADING FOR GUARDRAIL INSTALLATIONS																
Refer to EW-301.																
(1) Lane(s) to which the installation is adjacent.																
Line No.	Direction of Traffic (1)	Station	Side	Foreslope at Guardrail	X1 (FT)	Y1 (FT)	X2 (FT)	Y2 (FT)	X3 (FT)	Y3 (FT)	X4 (FT)	Y4 (FT)	Z (FT)	Excavation Class 10 (CY)	Embankment-in-Place (CY)	Remarks
1.0	EB	221+58.75	Right	3:1	77.3	9.1					150.0	10.6	32.2	34.9	2.4	
2.0	EB	223+75.25	Right	3:1	43.9	7.0					100.0	9.1	20.0	74.2	220.2	
3.0	WB	221+58.75	Left	3:1	43.9	6.8					100.0	9.2	22.7	27.6	0.3	
4.0	WB	223+75.25	Left	3:1	77.3	7.3					150.0	11.7	31.8	40.2	5.1	
Total:														176.9	228	

108 08A

4/25/25

STEEL BEAM GUARDRAIL AT CONCRETE BARRIER OR BRIDGE RAIL END SECTION

Possible Standards: BA-200, BA-201, BA-202, BA-205, BA-206, BA-209, BA-210, BA-211, BA-221, BA-225, BA-250, BA-260, LS-625, LS-626, LS-630, LS-635, SI-172, SI-173 and SI-211.

(1) Lane(s) to which the obstacle is adjacent.

(2) Not a bid item. Incidental to guardrail installation.

Line No.	Direction of Travel (1)	Side	Station	Offset (FT)	Barrier Transition Section	Barrier Transition Section (EA)	End Terminal	End Terminal Count (EA)	VT1 (LF)	VF (LF)	VT2 (LF)	ET (LF)	BA-211 Station	BA-211 (Type)	SI-211 (Type) (2)	Delineator SI-172 Type 1 (EA) (2)	Object Marker Type 2 (EA) (2)	Object Marker Type 3 Lt (EA)(2)	Object Marker Type 3 Rt (EA)(2)	Bolted End Anchor BA-202 (Type)	Bolted End Anchor BA-202 (EA)	Post Adapter BA-210 (EA)	Steel Beam Guardrail BA-200 (LF)	Remarks
1.0	EB	Right	221+58.75		BA-201	1	BA-205	1	78.125	25.00		47.70	221+25.21	1	3				1	D	1		62.5	Approach
2.0	EB	Right	223+75.25		BA-201	1	BA-205	1	53.125			47.70	224+08.79	1	1			1		D	1		12.5	Trailing
3.0	WB	Left	221+58.75		BA-201	1	BA-205	1	53.125			47.70	221+25.21	1	3			1		D	1		12.5	Trailing
4.0	WB	Left	223+75.25		BA-201	1	BA-205	1	78.125	25.00		47.70	224+08.79	1	1				1	D	1		62.5	Approach
Total:					4		4											2	2	4		150		

108_13A 3/27/25 SAFETY CLOSURES Refer to Section 2528 of the Standard Specifications			
Station	Road Closure Qty.	Hazard Closure Qty.	Remarks
218+88.80	1		West End
225+45.20	1		East End
Total:	2		

108_22
10/21/25

PAVEMENT MARKING LINE TYPES

Line factors based on 6-inch wide continuous line.

*BCY4 - Place on the same side of the roadway to match existing markings near the project.

**NPY4 - Estimating purposes only. No Passing Zone Lines will be located in the field.

***MNY6 - Factor of 1.00 includes number of 6-inch passes to cover median nose area.

BCY4: Broken Centerline (Yellow) @ 0.17

CBW6: Crosswalk Bar (White) @ 10.00

CLW6: Crosswalk Line (White) @ 2.00

DLW4: Dotted Line (White) @ 0.22

ELW6: Edge Line Right (White) @ 1.00

MNY6: Median Nose (Yellow) @ 1.00

RLY4: Ramp Edge Line Left (Yellow) @ 0.67

SPW4: Sloped Curb 4" (White) @ 2.16

STY6: Standard Curb 6" (Yellow) @ 2.03

BCY6: Broken Centerline (Yellow) @ 0.25

CHW8: Channelizing Line (White) @ 1.33

DCY4: Double Centerline (Yellow) @ 1.34

DLW6: Dotted Line (White) @ 0.33

ELY4: Edge Line Left (Yellow) @ 0.67

NPY4: No Passing Zone Line (Yellow) @ 0.84

RLY6: Ramp Edge Line Left (Yellow) @ 1.00

SPW6: Sloped Curb 6" (White) @ 2.28

YLV2: Yield Line (White) @ 1.15

BLC6: Broken Line Contrast (White/Black) @ 0.50

CHW10: Channelizing Line (White) @ 1.67

DCY6: Double Centerline (Yellow) @ 2.00

DLY4: Dotted Line (Yellow) @ 0.22

ELY6: Edge Line Left (Yellow) @ 1.00

NPY6: No Passing Zone Line (Yellow) @ 1.25

SLW2: Stop Line (White) @ 4.00

SPY4: Sloped Curb 4" (Yellow) @ 2.16

BLW4: Broken Lane Line (White) @ 0.17

CHY8: Channelizing Line (Yellow) @ 1.33

DDY4: Double Dotted Line (Yellow) @ 0.44

DLY6: Dotted Line (Yellow) @ 0.33

LDW8: Lane Drop (White) @ 0.33

RLW4: Ramp Edge Line Right (White) @ 0.67

SLW4: Solid Lane Line (White) @ 0.67

SPY6: Sloped Curb 6" (Yellow) @ 2.28

BLW6: Broken Lane Line (White) @ 0.25

CHY10: Channelizing Line (Yellow) @ 1.67

DDY6: Double Dotted Line (Yellow) @ 0.67

ELW4: Edge Line Right (White) @ 0.67

LDW10: Lane Drop (White) @ 0.42

RLW6: Ramp Edge Line Right (White) @ 1.00

SLW6: Solid Lane Line (White) @ 1.00

STW6: Standard Curb 6" (Yellow) @ 2.03

Line No.	Road ID	Station From	Station To	Lane	Marking Type	Left	Center	Right	Groove Marking Needed?	Groove Qty. (STA)	BCY4* (STA)	BCY4* Factored (STA)	BCY6 (STA)	BCY6 Factored (STA)	BLW4 Factored (STA)	DCY4 Factored (STA)	ELW6 (STA)	ELW6 Factored (STA)	Remarks
1.0	IA 92	219+88.80	224+95.27	EB	Waterborne/Solvent Paint			X									5.06	5.06	
2.0	IA 92	219+88.80	225+45.20	Both	Waterborne/Solvent Paint	X							5.56	1.39					
3.0	IA 92	220+38.73	225+45.20	WB	Waterborne/Solvent Paint			X									5.06	5.06	
4.0																			Waterborne Total = 11.51 STA

REMOVAL OF PAVEMENT Refer to Tabulation 102-5.							110_01 4/5/24
* Not a bid item.							
Line No.	Station From	Station To	Side	Pavement Type	Area (SY)	Saw Cut* (LF)	Remarks
1.0	220+24.38	221+60.77	Right	HMA/PCC	64.2	65.8	EB Approach Shoulder
2.0	224+04.54	224+99.63	Right	HMA/PCC	37.9	55.8	EB Trailing Shoulder
3.0	220+90.00	221+60.81	Both	HMA/PCC	207.2	56.6	West Approach
4.0	223+73.77	224+44.00	Both	HMA/PCC	220.6	58.3	East Approach
5.0	220+37.01	221+46.66	Left	HMA/PCC	40.8	51.3	WB Trailing Shoulder
6.0	224+06.28	225+10.54	Left	HMA/PCC	44.8	66.3	WB Approach Shoulder
Total:					615.5	354.1	

INDEX OF TABULATIONS				111_25 4/21/26
Line No.	Tabulation	Tabulation Title	Sheet No.	
1.0	100_01D	PROJECT DESCRIPTION	C.3	
2.0	100_19	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	C.4	
3.0	100_28	LONGITUDINAL GROOVING	C.5	
4.0	102_05	EXISTING PAVEMENT	C.6	
5.0	104_08A	SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN	C.7	
6.0	105_04	STANDARD ROAD PLANS	C.8	
7.0	107_23	GRADING FOR GUARDRAIL INSTALLATIONS	C.9	
8.0	108_08A	STEEL BEAM GUARDRAIL AT CONCRETE BARRIER OR BRIDGE RAIL END SECTION	C.10	
9.0	108_13A	SAFETY CLOSURES	C.11	
10.0	108_22	PAVEMENT MARKING LINE TYPES	C.12	
11.0	110_01	REMOVAL OF PAVEMENT	C.13	
12.0	110_07A	REMOVAL OF STEEL BEAM GUARDRAIL	C.14	
13.0	111_25	INDEX OF TABULATIONS	C.15	
14.0	112_06	BRIDGE APPROACH SECTION	C.16	
15.0	112_09	SHOULDERS	C.17	
16.0	190_51	MATERIALS FOR TYPE A SIGNS	C.18	
17.0	190_61	EXISTING SIGNS TO BE REINSTALLED	C.19	
18.0	101_16	ALIGNMENT COORDINATES	G.1	
19.0	108_23A	TRAFFIC CONTROL PLAN	J.1	
20.0	111_01	COORDINATED OPERATIONS	J.2	

112_06
2/22/24

BRIDGE APPROACH SECTION																					
Refer to the BR Series.																					
* Not a bid item																					
Line No.	Bridge Station	End	Skew Ahead Left (Degrees)	Skew Ahead Right (Degrees)	(T) Thickness (IN)	Pay Length (FT)	Non-Reinf. Area (SY)	Single-Reinf. Area (SY)	Double-Reinf. Area (SY)	SRP Approach	SRP Abutment Type	SRP Abutting Pavement	Perforated * 4" Subdrain (LF)	Subdrain * Outlet (STA)	Subdrain * Outlet Side	Porous * Backfill (CY)	Class 'A' * Crushed Stone Backfill (CY)	Modified * Subbase (TON)	Polymer * Grid (SY)	Special * Backfill (TON)	Remarks
1.0	222+67.00	W			12.0	70.0	118.0	78.3	77.8	BR-203		BR-211	49.9	221+00.00	Right	2.0		273.850	308.6		West Approach
2.0	222+67.00	E			12.0	70.0	118.0	78.3	77.8	BR-203		BR-211	44.7	224+34.00	Right	1.7		273.850	308.6		East Approach
Total:							236	156.6	155.6				94.6			3.7		547.7	617.2		

SHOULDERS																												112_09 4/21/26
(1) Lane(s) to which the shoulder is adjacent. (2) See Typ. 7156, 7157, or 7158. (3) Bid Item. (4) Applies only for Paved Shoulders constructed on project with existing granular shoulders. (5) Bid Item. Typ. 7156, 7157, or 7158. (6) Does not include shrink. (7) Paved shoulder thickness specified in Remarks. (8) Subbase type specified in Remarks.																												
Roadway Identification	Direction of Travel (1)	Station From	Station To	Side	P Width (FT)	P SG Width (2) (FT)	G Width (FT)	L Length (FT)	Class 13 Excavation (CY)(3)(4)	HMA (TON)	HMA (TON/STA)	Binder (TONS)	Paved Shoulder (3) (SY)	Shoulder at Grdnrail (5)(7)	Reinforced Paved Shoulder(3) (SY)	Special Backfill HMA Alt. (3) (TON)	Special Backfill HMA Alt. (TON/STA)	Special Backfill PCC Alt. (3) (TON)	Special Backfill PCC Alt. (TON/STA)	Pavement Scarification (SY)	Polymer Grid (SY)	Subbase (3) (8) (CY)	Granular Shoulder (3) (TON)	Granular Shoulder (TON/STA)	Shoulder Const. Alt (3) (STA)	Shoulder Const. Alt HMA (6) (CY)	Shoulder Const. Alt PCC (6) (CY)	Remarks
IA 92	EB	219+88.80	220+08.80	Right		6.45		20.00	2.8	7.439	37.193	0.446		14.3		5.250	26.250								0.20			
IA 92	EB	220+08.80	220+24.38	Right		6.20		15.58	2.3	5.580	35.815	0.335		10.7		3.948	25.340								0.16			
IA 92	EB	220+24.38	220+35.14	Right		6.62		10.76	1.0	4.103	38.135	0.246		8.0		2.885	26.810								0.11			
IA 92	EB	220+35.14	220+81.59	Right		6.37		46.45	2.8	17.074	36.758	1.024		33.0		12.063	25.970								0.46			
IA 92	EB	220+81.59	220+90.00	Right		5.39		8.41	0.5	2.640	31.392	0.158		5.0		1.890	22.470								0.08			
IA 92	EB	224+44.00	224+75.27	Right		4.41		31.27	1.3	8.161	26.100	0.490		15.3		5.976	19.110								0.31			
IA 92	EB	224+75.27	224+95.27	Right		4.91		20.00	1.3	5.756	28.782	0.345		10.9		4.158	20.790								0.20			
IA 92	EB	224+95.27	224+99.83	Right			8.7	4.56														1.429	31.346		0.05			
IA 92	WB	220+37.01	220+38.73	Left			8.55	1.72														0.530	30.814		0.02			
IA 92	WB	220+38.73	220+58.73	Left		5.27		20.00	0.5	6.148	30.740	0.369		11.8		4.410	22.050								0.20			
IA 92	WB	220+58.73	220+90.00	Left		4.52		31.27	1.0	8.366	26.753	0.502		15.8		6.085	19.460								0.31			
IA 92	WB	224+44.00	224+52.41	Left		3.54		8.41	0.4	1.799	21.387	0.108		3.3		1.348	16.030								0.08			
IA 92	WB	224+52.41	224+85.26	Left		4.56		32.85	1.7	8.860	26.970	0.532		16.8		6.439	19.600								0.33			
IA 92	WB	224+85.26	225+10.23	Left		6.69		24.97	1.9	9.577	38.352	0.575		18.5		6.729	26.950								0.25			
IA 92	WB	225+10.23	225+25.20	Left		7.68		14.97	2.8	6.566	43.862	0.394		12.7		4.569	30.520								0.15			
IA 92	WB	225+25.20	225+45.20	Left		7.29		20.00	3.3	8.352	41.760	0.501		16.2		5.838	29.190								0.20			
Total:									23.6	100.421		6.025		192.3		71.588						1.959			3.11			

190_51
2/10/23

MATERIALS FOR TYPE 'A' SIGNS

Refer to SI-101, SI-111, SI-119 and N Sheets.

Line No.	Type A Signing Typicals	Sign Number	Dir. of Travel	Sign Location Station	Wood Posts (No.)	4 x 6 Leg 1 (FT)	4 x 6 Leg 2 (FT)	Perf. Sq. Steel Leg 1 (FT)	Perf. Sq. Steel Leg 2 (FT)	Perf. Sq. Steel Leg 3 (FT)	Perf. Sq. Anchor Type	Anchor Quantity (EA)	Steel Rect. Tube (No)	Steel Rect. Tube (FT)	Rect. Tube Anchors (EA)	Type A Bracket One Post	Type A Bracket Two Post	Type A Bracket Auxiliary	Type A Bracket (H)	Type A Bracket (F)	Type A Bracket (F1)	Install. Type	Install. Dim X (FT)	Install. Signing Notes	Remarks	
1.0		I-3 "Middle River"	EB	221+54.00				13.0			Soil	1										1	6.0	RR & PB		
2.0		I-3 "Middle River"	EB	223+78.00				13.0			Soil	1										1	6.0	RR & PB		
Total:					26								2													

EXISTING SIGNS TO BE REINSTALLED										190_61 2/10/23
Line No.	Sign Description	Direction of Travel	Location Station	Number of Posts	Square Tube Steel Posts	Wood Posts 4"x4" (L F)	Wood Posts 4"x6" (L F)	Installation Type	Installation Dim 'X'	See Signing Notes
1.0	I-3 "Middle River"	EB	221+54.69	1	1			1	6.2	RR & PB
2.0	I-3 "Middle River"	WB	223+77.95	1	1			1	6.7	RR & PB
Total:				2						

232_03A 9/28/22 EROSION CONTROL (RURAL SEEDING) Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications. Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows: Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications. Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications. Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are all incidental to mobilization and will not be paid for separately.		259_01 10/15/25 SIGNING NOTES Apply the following during the replacement or modification of signs: - No more than one of the major guide signs for each direction of travel at an interchange out of service at any one time. - No major guide sign out of service for more than 8 hours. - No minor guide out of service for more than 24 hours. Remove existing signs and posts within 24 hours following the installation of a new replacement sign. In any case where the plans call for a new sign and posts to be installed at the same station location and offset as an existing sign, install the new posts at a minimum of either 5 ft ahead or behind the existing sign installation. Signs shall not be installed more than 25 ft ahead or behind the existing sign installation. Whenever posts for a replacement sign are erected directly in front of an existing sign, install the new replacement sign and remove the existing sign installation within 24 hours of the time that the new posts are erected. Where signs are located behind guardrail, locate the near edge of the sign a minimum of 3 ft behind the guardrail posts. Unless noted otherwise, leave auxiliary panels, such as exit number panels, in place or reattach to the sign using the existing mounting hardware. Also, when replacing an existing logo sign with a new logo sign, remove the business logo panel(s) from the existing sign and attach to the new sign as directed by the Engineer. Do not damage the auxiliary or logo panels when removing and reattaching them. This work is incidental to other work and no separate payment will be made. The following notes apply to the corresponding sign installations shown on the plan sheets and listed in the tabulations. IB INSTALL NEW TYPE B SIGN IA INSTALL NEW TYPE A SIGN Install new signs at the location identified in the plans. For installation of new signs on an existing sign support structure, refer to note (L). For installation of new signs on existing posts: - if the new sign is taller than the existing sign, furnish the necessary hardware to extend the sign above the posts. Refer to Standard Road Plan SI-132. - if the new sign is shorter than the existing sign: - for wood posts and perforated square tube posts, install the sign at the proper height and cut off the excess post length. - for MASSH-400 and steel breakaway posts, install the sign at the top of the posts. For plywood signs, no vertical splices are allowed in signs less than or equal to 10 ft wide. No horizontal splices are allowed in signs less than or equal to 4 ft tall. Each new sign installed shall have a sticker applied to the back of the sign that shows the date the sign was installed. The Contractor shall supply the sticker for all contractor supplied signs. The DOT will supply date		259_01 10/15/25 SIGNING NOTES stickers on any signs supplied by the department. Payment for installing Type A signs or Type B signs includes furnishing hardware for mounting, extending signs above existing posts, and cutting posts to length. MS MODIFICATION OF EXISTING SIGNS For removal and/or installation of logo panels, and other sign modifications. Refer to the project plans and typical details for additional information. SC SIGN COVER For the installation or removal of temporary sign covers for the purposes of temporary traffic control. Sign covers shall completely cover the existing Sign. Care should be taken so that covers, fasteners, and installation practices do not damage the existing sign. Tape of any type shall not be applied to the sheeted face of the existing sign under any circumstances. Repair of damage to the existing sign caused by sign covers will be the responsibility of the Contractor. SO OVERLAY TYPE B GUIDE SIGNS MB INSTALL SPECIAL MOUNTING BRACKET Install special mounting brackets at the locations identified in the plans. Refer to Tabulations 190-51 and/or 190-65. PB INSTALL NEW BREAKAWAY STEEL POSTS AND FOOTING PP INSTALL NEW PERFORATED SQUARE TUBE POSTS AND ANCHORS PM INSTALL NEW MASSH-400 POSTS AND ANCHORS Install new breakaway steel posts and footings, perforated square tube posts and anchors, or MASSH-400 posts and anchors at the locations identified in the plans. Refer to the Standard Road Plans, Typicals, and Tabulations 190-51 and 190-50 for post size and footing information. New posts shall be installed in undisturbed soil. The new posts shall not be placed in the hole of removed posts. Remove excess soil from footing hole. Do not spread soil on adjacent seeded or vegetated areas. If note (RR) accompanies (PB), (PP), or (PM), install an existing sign on the new posts. RR REMOVE AND REINSTALL SIGN AS PER PLAN Do not remove existing major Type B guide signs on posts until the new posts are installed. Promptly remove sign and install at the new location. Existing major Type B guide signs on overhead support structures, minor Type B guide signs, plywood signs, and Type A signs may be removed and stored. Transport the signs to a DOT storage area as designated by the Engineer. Transport the signs back to the job site when ready for installation at the new location. Signs to be reinstalled shall not be stored for any length of time with the sheeted face in contact with the ground. Replace signs damaged by the Contractor's activities at no additional cost to the Contracting Authority. Payment for Remove and Reinstall Sign includes sign		259_01 10/15/25 SIGNING NOTES removal, delivery to and from the DOT storage area (if applicable), and reinstallation, including any hardware required for reinstallation. When noted in the plans, payment for delivery and stockpile of existing signs will be separate from the payment for Remove and Reinstall Sign. RA REMOVAL OF TYPE A SIGN ASSEMBLY RB REMOVAL OF TYPE B SIGN ASSEMBLY Type A Sign Assembly consists of one or more signs installed on one or more posts, either directly mounted to the post or mounted to the post with special sign mounting brackets. Type B Sign Assembly consists of the main sign, all auxiliary signs and brackets, and posts. Unless stated otherwise in the plans, remove all posts with the signs and brackets. Remove each sign assembly identified in the plans. Sign posts removed become the property of the Contractor. All other materials removed remain the property of the DOT. For each sign assembly removed, disassemble each assembly before delivering to the DOT. * For Type A sign assemblies, unbolt all signs, special mounting brackets, and posts from each other. * For Type B assemblies, unbolt all extruded aluminum panels, brackets, and posts from each other. Do not damage the disassembled materials. When the plans call for the removal of posts, the entire existing post shall be removed. The post shall not be broken off or cut off at the ground line. Place backfill in holes remaining from the removal of posts and restore to the surrounding conditions. Deliver the removed signs, special sign mounting brackets, and extruded aluminum panels to a DOT storage area, as designated by the Engineer. The concrete footings for steel posts are not considered part of the sign assembly. Refer to note RF for concrete footing removal. Payment for Removal of Type A Sign Assembly or Removal of Type B Sign Assembly includes sign assembly removal and disassembly, post removal (if applicable), delivery to the DOT storage area, placing backfill in holes, and restoration of the surrounding conditions. RF REMOVE EXISTING CONCRETE FOOTING FOR STEEL POST Remove existing concrete footings to a depth of at least 1 ft below the natural groundline. Place backfill in holes remaining from removal and restore to the normal surrounding conditions. This work is incidental to other work and no separate payment will be made. RS REMOVE EXISTING TYPE B SIGN SUPPORT STRUCTURE The following are considered Type B Sign Support Structures: - Overhead sign trusses and foundations - Cantilever sign trusses and foundations - Bridge-mounted brackets			
FILE NO.	32391	ENGLISH	DESIGN TEAM	WHKS & CO.	MADISON COUNTY	PROJECT NUMBER	BRF-092-4(030)--38-61	SHEET NUMBER	C.20

259_01 10/15/25	
SIGNING NOTES	
Unless stated otherwise in the plans, existing overhead trusses, cantilever trusses, and bridge brackets which are removed become the property of the Contractor. If stated in the plans, deliver overhead trusses, cantilever trusses, and bridge brackets to a DOT storage area, as designated by the Engineer. Payment for Removal of Sign Support Structure and Foundation includes sign support structure removal, delivery to the DOT storage area (if applicable), and restoration of the surrounding conditions. Removal of the foundation includes removal of the stem to a minimum of 1 ft below the natural groundline. L MODIFY SIGN SUPPORT ANGLES NEEDED TO INSTALL SIGNS ON EXISTING SIGN SUPPORT STRUCTURES Refer to the sign support structure details for information on the required angle brackets. Provided all specifications are met, the existing sign support angles may be reused. Install existing sign support angles to be reused only on the sign support structure from which they were removed. Sign support angles removed and not reused become the property of the Contractor. When reusing the existing sign support angles with a shorter replacement sign, the sign support angles may need to be trimmed. Refer to the sign support details to determine if and where to trim the sign support angles. Do not use existing fasteners. Use new U-Bolts, stainless steel bolts and nuts to install the existing or new sign support angles to the sign support structure. Removal of existing sign support angles is incidental to removal of the sign. Reinstalling and/or modifying existing sign support angles; furnishing and installing new sign support angles (if required); and furnishing and installing new fasteners is incidental to work associated with Type B signs. SIGN INSTALLATION QUALITY CONTROL NOTES Post lengths have been derived from the proposed grading cross sections. Verify post lengths in the field prior to ordering or fabrication. Slight differences between the design template and the actual conditions should be expected. These variations should be resolved by doing some localized shaping and grading. Obtain material needed to meet the site requirements of SI-112 from the excavation and/or the area immediately adjacent to the work. Ensure reshaping work does not substantially change foreslopes or the drainage in the vicinity of the sign. Significant differences between the plan design and the actual field conditions shall be resolved in this manner: Survey the location and draw the actual template on the cross section. Recalculate each post length and compare to the maximum allowable leg length. If all of the maximum leg lengths are less than or equal to the maximum allowable leg length, then the proposed post design will be sufficient. If any leg is greater than the maximum allowable leg length, then submit the cross section with the actual template drawn (including offsets and elevation from the survey shown) to the Engineer. The Engineer may forward	

259_01 10/15/25	
SIGNING NOTES	
this information to the Engineer of Record in order to complete a new post design. Install the footings, stub posts, and posts according to the tolerances shown on the applicable SI Series Standard Road Plans. Footing construction is the controlling activity that substantially affects the quality of the site installation. Verify the elevation difference between the stubs is exactly the same as the elevation difference between the post lengths. If the Engineer requests, submit documentation detailing the site cross section in order to verify site installation.	
262_06 9/28/22	
UTILITIES (NOT A POINT 25 PROJECT)	
This is NOT a POINT 25 project and is not subject to the provisions of IAC 761-115.25.	

SURVEY SYMBOLS

	Interstate Highway Symbol		Septic Tank
	U.S. Highway Symbol		Cistern
	Iowa Highway Symbol		L.P. Gas Tank (No Footing)
	County Road Highway Symbol		Underground Storage Tank
	Evergreen Tree		Latrine
	Deciduous Tree		Satellite TV Dish
	Fruit Tree		Water Hook Up
	Shrub (Bushes)		Radio Tower
	Timber		Tower Anchor
	Hedge		Guardrail (Beam or Cable)
	Stump		Guard Post (one or two)
	Swamp		Guard Post (over two)
	Rock Outcrop		Filler Pipe
	Broken Concrete		Gas Valve
	Revetment (Rip Rap)		Water Valve
	Cemetery		Speed Limit Sign
	Grave		Mile Marker Post
	Cave		Sign
	Sink Hole		Traffic Signal Control Box
	Board Fence		Rail Road Signal Control Box
	Chain Link or Security Fence		Telephone Switch Box
	Wire Fence		Electric Box
	Terrace		
	Earth Dam or Dike (Existing)		
	Tile Outlet		
	Edge of Water		
	Existing Drainage		
	Right of Way Rail or Lot Corner		
	Concrete Monument		
	Well		
	Windmill		
	Beehive Intake		
	Existing Intake		
	Existing Utility Access (Manhole)		
	Fire Hydrant		
	Water Hydrant (Rural)		

UTILITY LEGEND

CASEY MUTUAL TELEPHONE COMPANY
Contact: John C. Breining
Phone: (515)-746-2222
Email: caseymutual@netins.net

CENTURYLINK
Contact: Sadie Hull
Phone: (918)-547-0147
Email: sadie.hull@lumen.com

MEDIACOM
Contact: Kevin Collins
Phone: (515)-246-6668
Email: kcollins1@mediacomcc.com

VERIZON
Contact: John Bachelder
Phone: (972)-729-7000
Email: asg.investigationsteam@asginc.us

SOUTHERN IOWA RURAL WATER ASSOCIATION
Contact: Chad Mahan
Phone: (641)-782-5744
Email: cmahan@sirwa.org

CENTURYLINK
Contact: Tech on Duty
Phone: (877)-366-8344
Email: nationalrelo@centurylink.com

No utility conflicts are anticipated for the project. Contact info is provided as a convenience for any unexpected encounters.

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.		
Green	(2)		Existing Topographic Features and Labels
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)		Existing Utilities
SHADING	Design Color No.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading 50%
Yellow	(4)		Proposed Pavement Shading 50%
Orange	(6)		Proposed Granular Shading 50%
Orange	(70)		Proposed Shoulder Granular Shading 50%
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading 50%
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading 50%
Brown, Light	(236)		Grading Shading 50%
Orange, Light	(134)		Proposed Granular Entrance Shading 50%
Yellow	(220)		Proposed Paved Entrance Shading 50%
Tan	(8)		Proposed Sidewalk Shading 50%
Blue, Light	(230)		Proposed Sidewalk Landing Shading 50%
Pink	(11)		Proposed Sidewalk Ramp Shading 50%
Red	(3)		Proposed Structure Shading 50%
Red	(3)		Delineates Restricted Areas 0%

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.		
Green	(10)		Existing Ground Line Profile
Blue	(1)		Proposed Profile and Annotation
Magenta	(5)		Existing Utilities
Blue, Light	(230)		Proposed Ditch Grades, Left
Black	(0)		Proposed Ditch Grades, Median
Rust	(14)		Proposed Ditch Grades, Right

	Reference Point	
	Station	Survey Line
	Section Corner	
	Ground Line Intercept	
	Saw Cut	
	Guardrail	
	Trench Drain	
	HighTension Cable Guardrail	
	Sheet Pile	
	Pavement Removal	Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

	Proposed Right-of-Way Symbol
	Proposed Right-of-Way Line
	Existing Right of Way
	Existing and Proposed Right-of-Way
	Easement and Existing Right-of-Way
	Easement (Temporary) Symbol
	Easement (Temporary) Line
	Easement
	C/A Access Control
	Property Line Symbol
	Property Line

PLAN AND PROFILE
LEGEND AND SYMBOL
INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)

FILE NO. 32391

ENGLISH

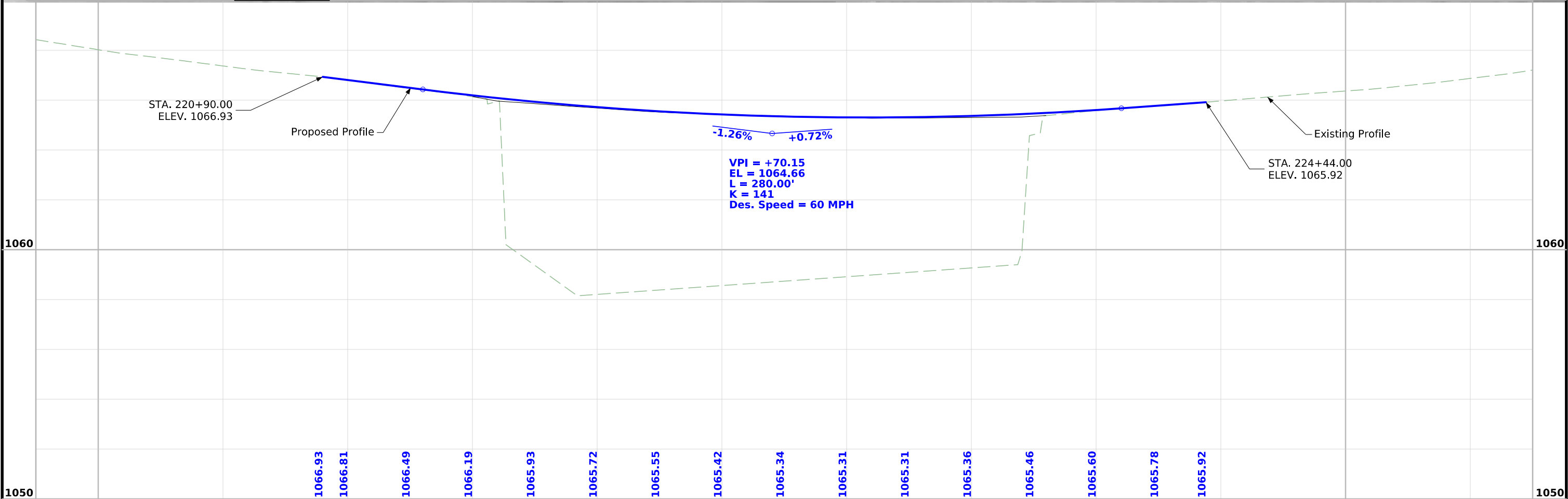
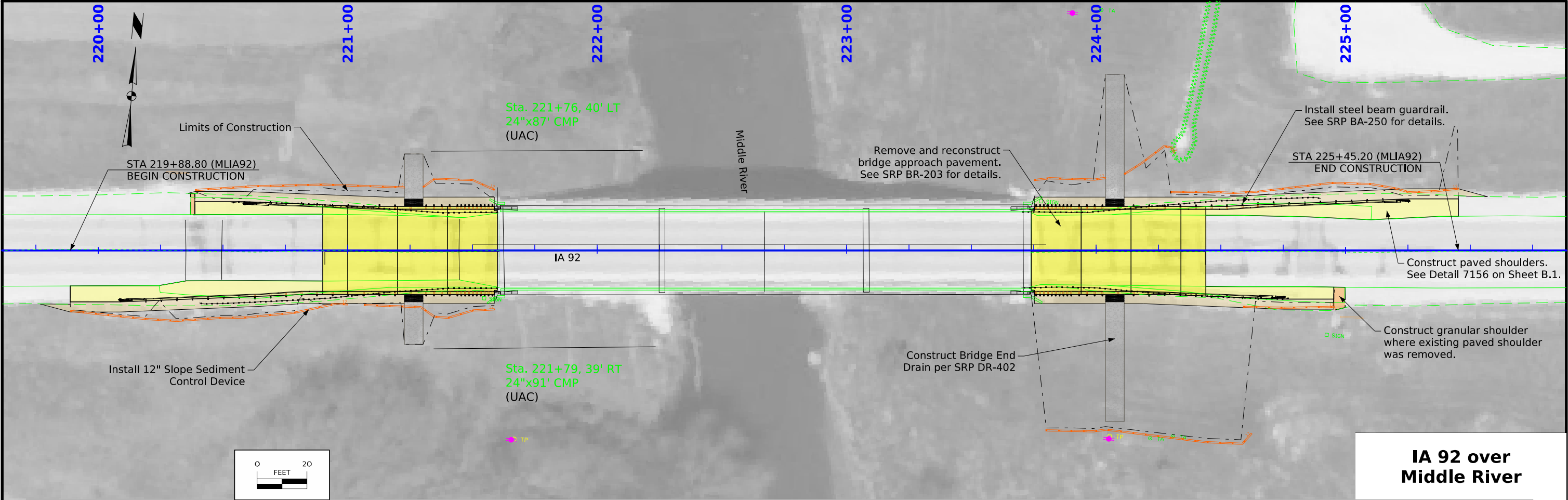
DESIGN TEAM WHKS & Co.

MADISON

COUNTY

PROJECT NUMBER BRF-092-4(030)--38-61

SHEET NUMBER D.1



101_16 10/25/24																				
ALIGNMENT COORDINATES																				
Line No.	Name	Location	Point on Tangent Station	Point on Tangent Y Northing	Point on Tangent X Easting	Begin Spiral Station	Begin Spiral Y Northing	Begin Spiral X Easting	Begin Curve Station	Begin Curve Y Northing	Begin Curve X Easting	Simple Curve PI or Master PI Station	Simple Curve PI or Master PI Y Northing	Simple Curve PI or Master PI X Easting	End Curve Station	End Curve Y Northing	End Curve X Easting	End Spiral Station	End Spiral Y Northing	End Spiral X Easting
1.0	1	MLIA92	216+00.00	7389061.810	18362852.484															
2.0	2	MLIA92	229+52.99	7389178.141	18364200.46															

108_23A
8/15/22

TRAFFIC CONTROL PLAN

IA 92 over the Middle River will be closed during construction and will utilize a detour route. Refer to Sheets J.3-J.4 for details. Traffic will be detoured with the following route:

Eastbound Traffic: Traffic will travel South on Henry A Wallace Road to 310th St. for 7.0 miles. Then East on 310th St. for 9.1 miles to Deer Run Ave.. Then North for 8.5 miles to IA 92.

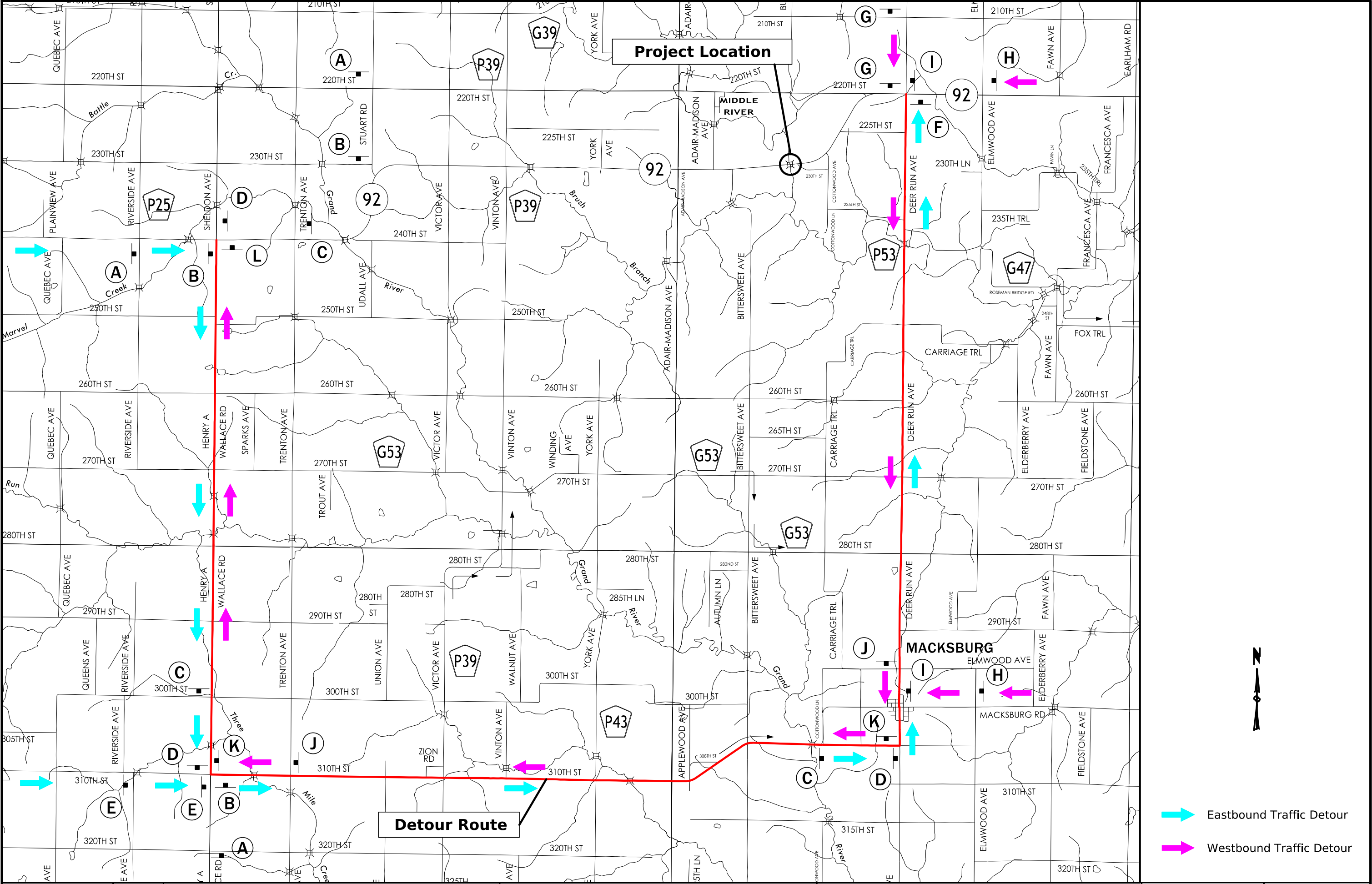
Westbound Traffic: Traffic will travel South on Deer Run Ave. for 8.5 miles to 310th St. Then West on 310th St. for 9.1 miles to Henry A Wallace Road. Then North for 7.0 miles to IA 92.

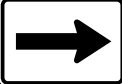
111_01
10/14/22

COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
	District to Provide.



A M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" M5-1, 30" X 21" DETOUR EAST 92 	B M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" M6-1, 30" X 21" DETOUR EAST 92 	C M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" M5-1, 30" X 21" DETOUR EAST 92 	D M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" M6-1, 30" X 21" DETOUR EAST 92 	E M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" M6-3, 30" X 21" DETOUR EAST 92 	F M4-8b, 30" X 15" M4-8, 30" X 15" M3-2, 30" X 15" M1-5, 24" X 24" END DETOUR EAST 92	G M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" M6-3, 30" X 21" DETOUR WEST 92 
H M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" M5-1, 30" X 21" DETOUR WEST 92 	I M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" M6-1, 30" X 21" DETOUR WEST 92 	J M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" M5-1, 30" X 21" DETOUR WEST 92 	K M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" M6-1, 30" X 21" DETOUR WEST 92 	L M4-8b, 30" X 15" M4-8, 30" X 15" M3-4, 30" X 15" M1-5, 24" X 24" END DETOUR WEST 92		

Detour Route Signage

Addendum: Sign Placements and Language for the IA 92 Bridge Over the Middle River

This stream is identified as a navigable water way and is granted protection in the interest of public safety under the Authority 7 of Iowa Code Chapter 462A.32.

Contractor shall contact the Iowa DNR water trails coordinator prior to starting and finishing project construction so the appropriate information can be entered into the DNR’s interactive river mapping system.

- The Iowa DNR contact is John.wenck@dnr.iowa.gov
- The Iowa DNR shall be contacted no less than one week prior to placing and removing obstructions in channel.

Contractor shall provide, install, maintain, and remove all paddle route signs.

- Refer to map for Paddle Route sign locations
- Sign mounting methods used to install temporary signs shall be at the discretion of applicants and/or their contractors, and are not to be construed as limited to Iowa DNR methods listed in Chapter 6 of *Developing Water Trails in Iowa* found at <https://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Water-Trail-Development>.
- Contractor shall coordinate sign placement and installation with Conservation Officer Craig Lonneman via phone #515-238-5005 or email Craig.Lonneman@dnr.iowa.gov.
- Contractor shall coordinate sign placement and management for Middle River Forest Park Access with Adair County Conservation via phone #641-743-6450 or email office@adaircountyconservation.org
- Contractor shall coordinate sign placement and management for Schildberg Access with Madison County Conservation via phone #515-462-3536 or email madccb@madisoncountyparks.org.

Maintenance of Paddle Route signage shall meet the same requirements as roadway traffic control per Standard Specifications articles 2528.01C, 2528.02 and 2528.03.

Signs shall be maintained by applicants and/or their contractor so as to be visible throughout the period the channel is obstructed. When obstructions to the channel are not needed for a period of 30 days or greater, signage should be temporarily removed.

Use color coding for all in this color style according to *Developing Water Trails In Iowa* (<https://www.iowadnr.gov/Things-to-Do/Canoeing-Kayaking/Water-Trail-Development>) criteria:

Sign # on Map	Quantity	Style	Minimum Letter Height	Language	Location Orientation
1	1	Orange/Warning	3"	Construction Hazard at Hwy 92 Bridge ----- Exit at Schildberg Access	At the top of the boat ramp or carry-down access, facing parking area.
2	1	Orange/Warning	3"	Construction Hazard at Hwy 92 Bridge ----- Don't Launch Here For Downstream Trip	At the top of the boat ramp or carry-down access, facing parking area.
3	4	Red/Danger	4"	No Thru Traffic	At bridge site, opposite sides of the river, 1 pair facing upstream, 1 pair facing downstream; OR, 2 signs placed near center of channel 12 feet above regular water level, one facing upstream, one facing downstream.

