

Index of Sheets	
No.	Description
Sheets	Bridge Plan
A.1	Title Sheet
A.2	Location Map Sheet
V.1	Estimated Quantities - Design 227
V.1 - V.8	Design 227
Road Sheets	Road Plan
A.3 - U.1	Road Plans



PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM SHELBY COUNTY

Deck Joint Repair

IA 44 over West Nishnabotna River
1.3 Mi. E of Jct. U.S. 59

Refer to the Plan Sheets for list of applicable specifications.

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



Preliminary
Not For Construction

Revisions to this Design Plan and/or
Project Specifications should be
submitted by 8/7/2026

Iowa DOT Bridges and Structures
Consultant Coordinator Contact:
Zahrah Alghalibi

**Standard Road
Plans**

Standard Road Plans are listed on Sheet C.2

Design Data Urban

2024 AADT	3,530	V.P.D.
TRUCKS	9	%

Index of Seals		
Sheet No.	Name	Type
A.1	Frazer L. Wallen	Structural Design
A.3	Cory D. Tap	Roadway Design

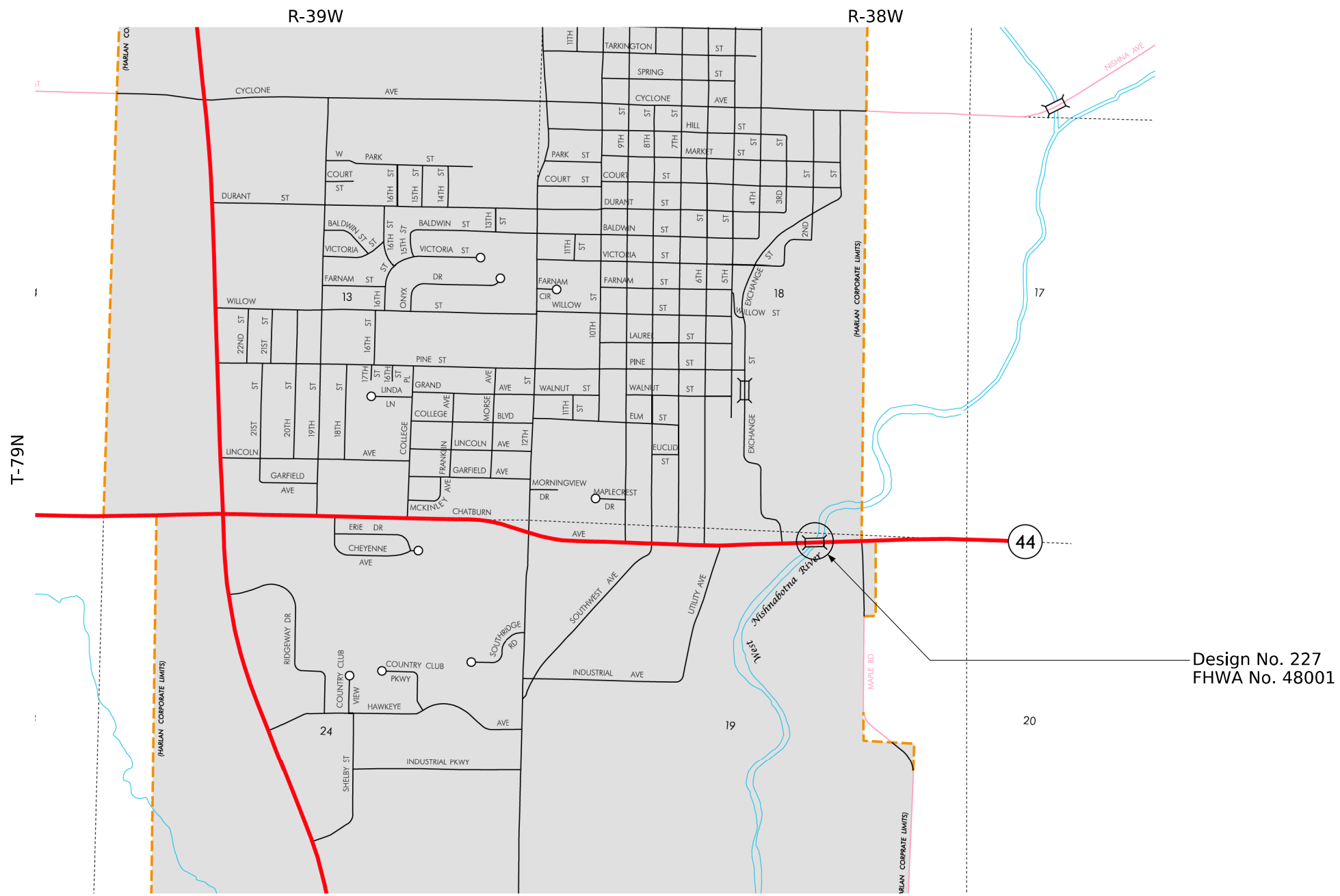
PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 7/24/2026

Revisions

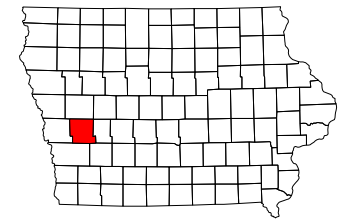
	TOTAL XX
PROJECT IDENTIFICATION NUMBER	
26-83-044-010	
PROJECT NUMBER	
MB-044-4(502)22--77-83	
R.O.W. PROJECT NUMBER	
PROJECT DIRECTORY NUMBER	
8304401026	



LEGEND

INTERSTATE ROUTE	
FREEWAY OR EXPRESSWAY ROUTE	
U.S. NUMBERED ROUTE	
BUSINESS ROUTE	
STATE NUMBERED ROUTE	
UNSIGNED ROUTE	
COUNTY NUMBERED ROUTE	
SECONDARY ROAD OR ADJOINING CITY STREET	
CITY STREET	
PARK, INSTITUTION, OR FEDERAL ROAD	
RAILROAD	
CORPORATION LINE	
SECTION LINE	
CUL-DE-SAC	
SECTION, TOWNSHIP & RANGE NUMBERS	

City of Harlan Location Map
Not to Scale



INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets
A.3	Title Sheet
B Sheets	Typical Cross Sections and Details
B.1 - 3	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA-44
J Sheets	Traffic Control and Staging Sheets
* J.1	Traffic Control Plan
* J.1	Staging Notes
* J.1	Coordinated Operations
* J.1	511 Travel Restrictions
* J.2 - 4	Staging and Traffic Control Sheets
* J.5	Staging Cross Sections
U Sheets	500 Series, Mod.Stds. and Detail Sheets
U.1	Pinned to Unpinned TBR Layout
U.2 - 4	Modified BR-203
	* Color Plan Sheets

PRELIMINARY PLANS

Subject to change by final design.

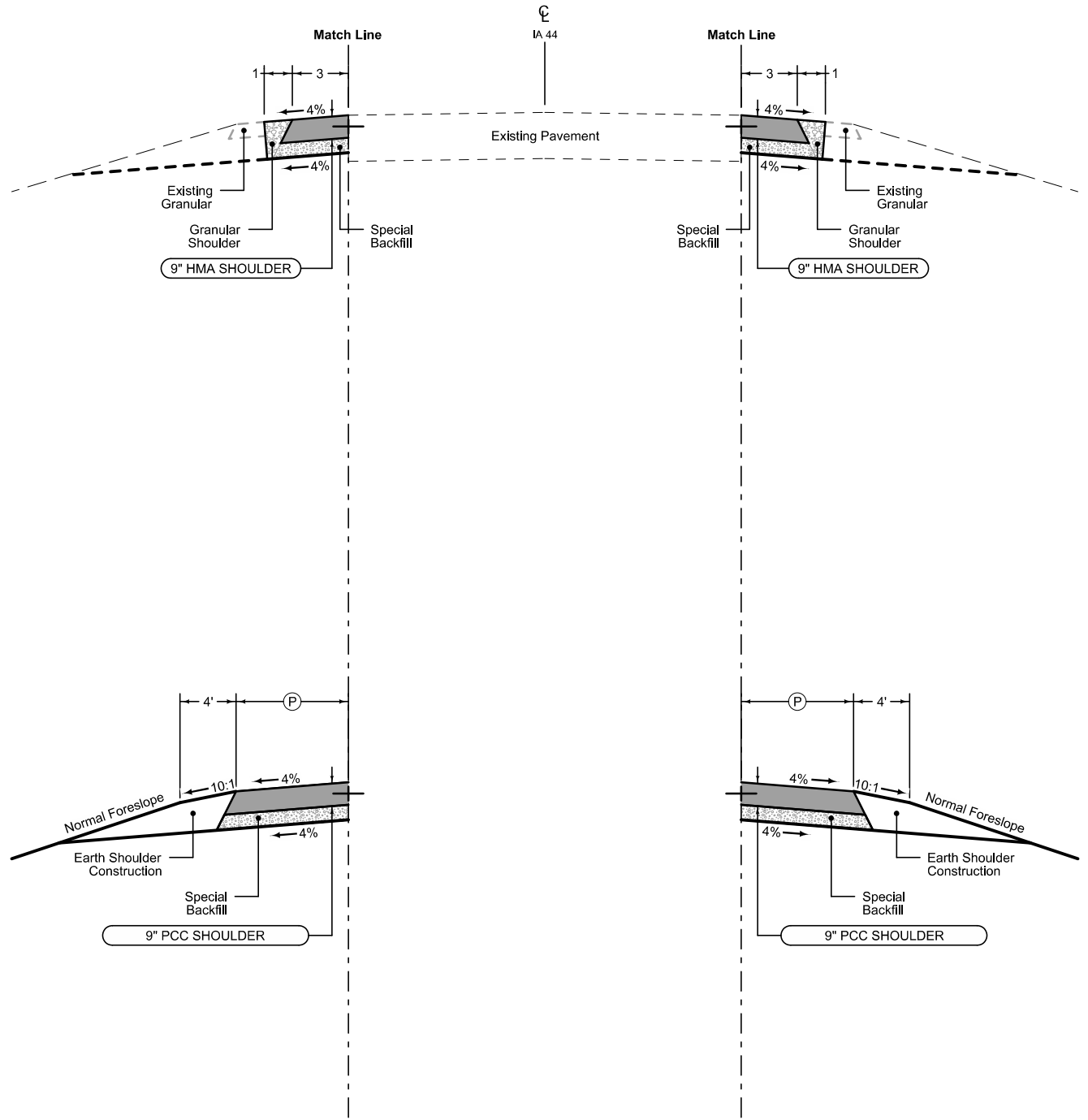
D5 PLAN - Date: 7/24/2026

Combination Shoulder

Shoulder Jointing: Longitudinal joint: B	
2_C_ Modified	
STATION TO STATION	
666+80.00	670+45.00
Bridge and Approaches	
676+28.00	679+25.00

Paved Shoulder at Guardrail

PCC Shoulder Jointing: Longitudinal joint: B Transverse joints: C at mainline spacing HMA Shoulder Jointing: Longitudinal joint: B		
2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
670+45.00	670+64.29	13.2
670+64.29	671+26.29	3.2-1.7
Bridge and Approaches		
675+45.71	676+28.00	11.7-13.2



Combination Shoulder

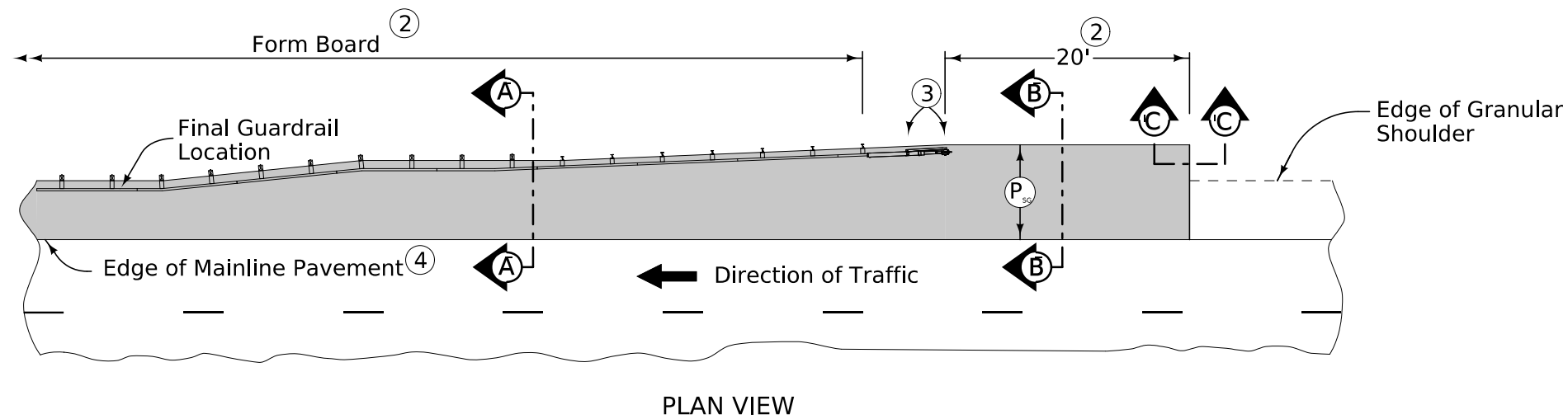
Shoulder Jointing: Longitudinal joint: B	
2_C_ Modified	
STATION TO STATION	
666+80.00	669+92.00
Bridge and Approaches	
675+77.00	678+85.00

Paved Shoulder at Guardrail

PCC Shoulder Jointing: Longitudinal joint: B Transverse joints: C at mainline spacing HMA Shoulder Jointing: Longitudinal joint: B		
2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
669+92.00	670+64.29	13.2-11.7
670+64.29	670+76.29	1.7
Bridge and Approaches		
674+95.71	675+45.71	1.7-3.1
675+45.71	675+77.00	13.1-13.2

See Tab 100-24 for pavement quantities.
See Tab 112-9 for shoulder quantities.

IA 44

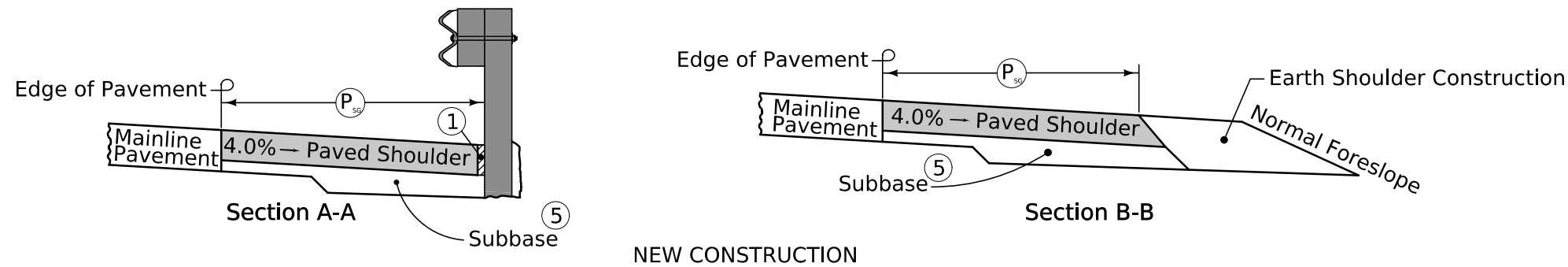


9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

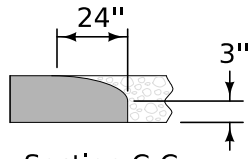
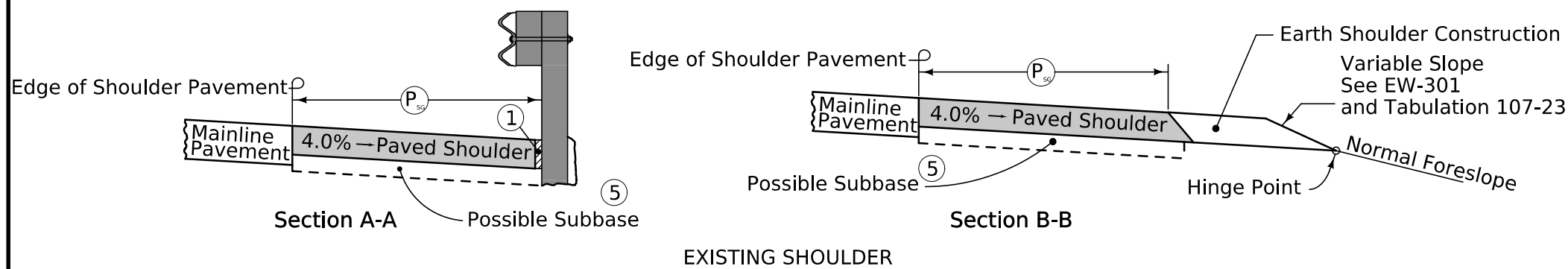
Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal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

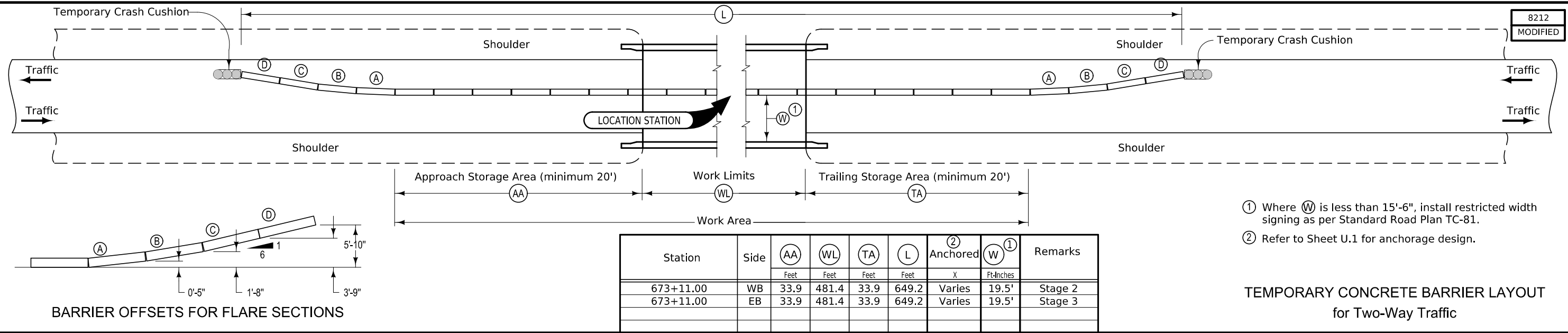
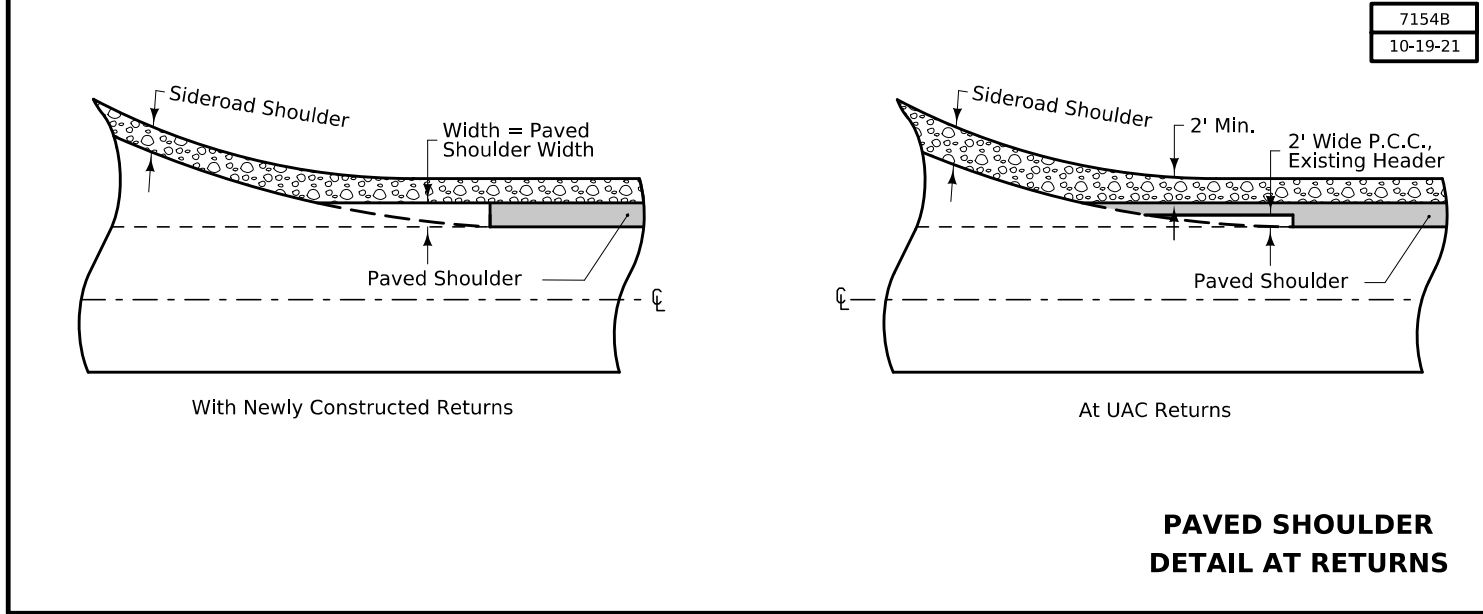
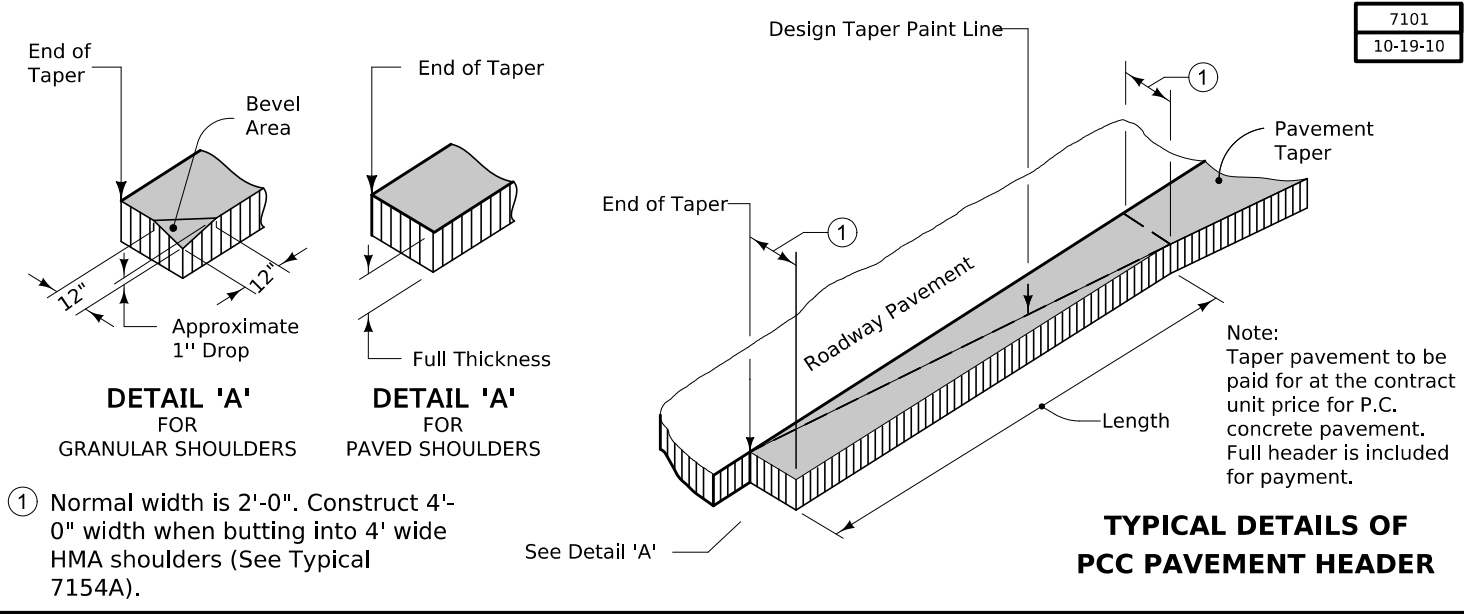
Refer to Tabulation 112-9 for shoulder quantities.



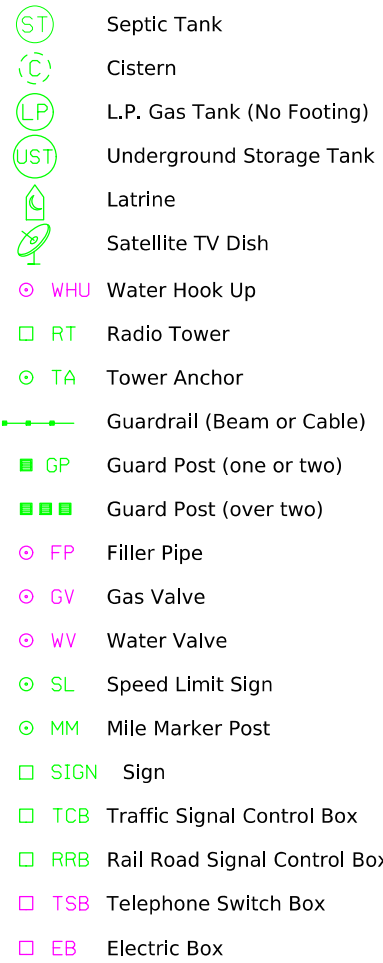
- 1 PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown.
- 2 Continue paved shoulder 20 feet beyond the center of the first post.
- 3 Shoulder may be notched for first 2 posts or post sleeves 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. Depth dependant on pavement type. 6" for HMA or 7" for PCC.



PAVED SHOULDER AT GUARDRAIL
(GRANULAR SHOULDER ADJACENT TO MAINLINE)



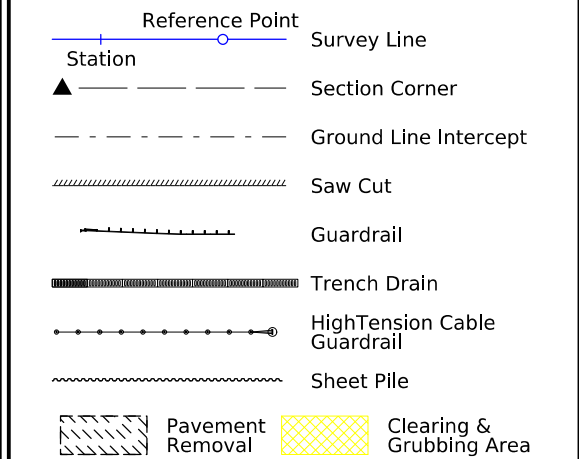
	Interstate Highway Symbol
	U.S. Highway Symbol
	Iowa Highway Symbol
	County Road Highway Symbol
	Evergreen Tree
	Deciduous Tree
	Fruit Tree
	Shrub (Bushes)
	Timber
	Hedge
	Stump
	Swamp
	Rock Outcrop
	Broken Concrete
	Revetment (Rip Rap)
	Cemetery
	Grave
	Cave
	Sink Hole
	Board Fence
	Chain Link or Security Fence
	Wire Fence
	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)



Not Marked	Farmers Mutual Telephone
Not Marked	Harland Municipal Utilities
Not Marked	Mediacom Cable
Not Marked	Windstream Communications
Not Marked	Marne & Elk Telephone

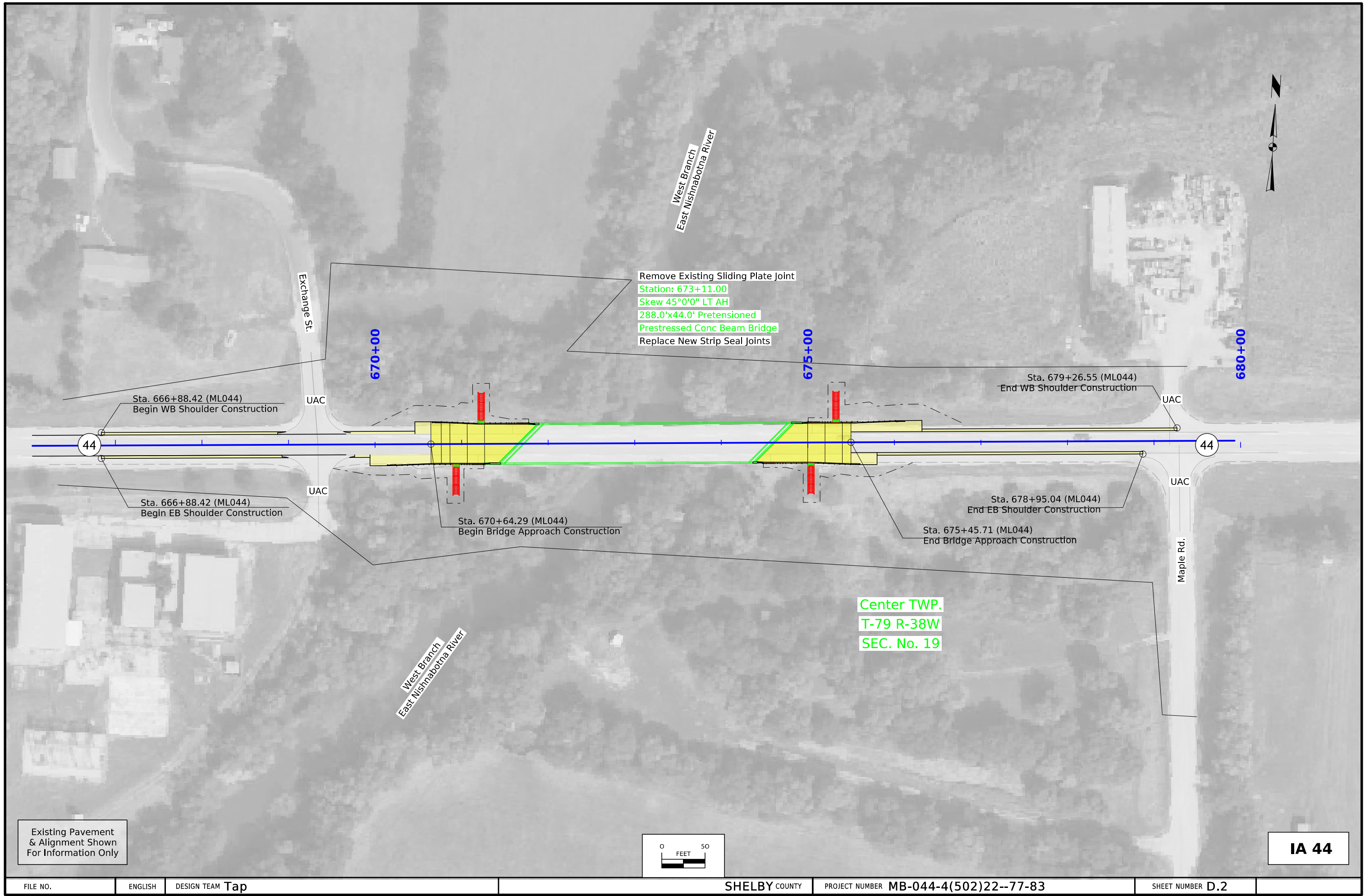
LINEWORK		Design Color No.		
Green	(2)		Existing Topographic Features and Labels	
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Magenta	(5)		Existing Utilities	
SHADING		Design Color No.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading	50%
Yellow	(4)		Proposed 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%

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

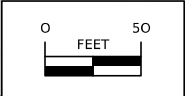


- Proposed Right-of-Way Symbol
- Proposed Right-of-Way Line
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary) Symbol
- Easement (Temporary) Line
- Easement
- Access Control
- Property Line Symbol
- Property Line

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



Existing Pavement
& Alignment Shown
For Information Only



IA 44

108-25
10-21-14

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			None provided.									

108-26A
08-01-08

STAGING NOTES

Stage 1:

Traffic:

All lanes of traffic to remain open during construction of temporary pavement.

Construction:

Set up temporary traffic control devices on IA 44 for the duration of the project.

Temporary pavement on outside WB lane from Sta. 667+00.00 to 671+59.00 and 675+05.00 to 679+18.00.

Stage 2:

Traffic:

Shift to one lane traffic to existing WB lane of bridge using traffic signals.

Exchange St. and Maple Rd. to be closed to traffic during construction

Construction:

Install EB bridge end drains (rock flumes) on both sides of the bridge.

Remove EB existing paving notch and install retrofit paving notch.

Remove existing EB sliding plate joint and replace with new strip seal joints.

Remove and replace EB approach pavement on both ends of bridge with 70’ standard approach.

Remove and replace EB guardrail on both sides of the bridge.

Pave the EB shoulders in front of the guardrail.

Temporary pavement on outside EB lane from Sta. 667+00.00 to 669+94.00 and 675+77.00 to 678+95.04.

Stage 3

Traffic:

Shift to one lane traffic to existing EB lane of bridge using traffic signals.

Exchange St. and Maple Rd. to be closed to traffic during construction

Construction:

Install WB bridge end drains (rock flumes) on both sides of the bridge.

Remove WB existing paving notch and install retrofit paving notch.

Remove existing WB sliding plate joint and replace with new strip seal joints.

Remove and replace WB approach pavement on both ends of bridge with 70’ standard approach.

Remove and replace WB guardrail on both sides of the bridge.

Pave the WB shoulders in front of the guardrail.

Stage 4

Traffic:

Remove all temporary traffic control devices on IA 44.

IA 44 will be fully open in both directions

Exchange St. and Maple Rd. to be opened to traffic.

Construction:

108-23A
08-01-08

TRAFFIC CONTROL PLAN

IA 44 Traffic will be maintained with one lane traffic on the bridge, which will require two stages of construction. Traffic Control will involve Standard Road Plan TC-217, Lane Closure with Signals and TBR. Shoulder strengthening is included

111-01
04-17-12

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
None provided.	

FILE NO.

ENGLISH

DESIGN TEAM Tap

SHELBY COUNTY

PROJECT NUMBER MB-044-4(502)22--77-83

SHEET NUMBER J.1

4/1/2026

7:39:18 AM

emcdona

c:\pw_work\pwmmain\idotcentral_emcdona\d2639287\J01_83044502Z06.xlsm

LEGEND

◆

Single White Delineator

●

Channelizing Device

×

Drum

○➤

Traffic Signal

┆

Traffic Sign

┆

Type III Barricade

←

Direction of Traffic

—

Safety Closure

▢

Vehicle Detection Area

●●●●●

Temporary Crash Cushion

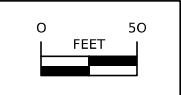
NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.



Existing Pavement
& Alignment Shown
For Information Only

Refer to TC-217
for signal timing
and other details

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS			
LINEWORK	Design Color No.		
Green	(2)	Existing Topographic Features and Labels	
Magenta	(5)	Pavement Marking Call Outs	
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Yellow	(4)	Pavement Markings, Yellow	
Off White	(254)	Pavement Markings, White	
Violet	(15)	Temporary barrier rail, Unpinned	
Flush Orange	(228)	Temporary barrier rail, Pinned	
SHADING	Design Color No.		
Green, Light	(225)	Existing Pavement Shading	
Gray, Light	(48)	Previously Constructed Pavement Shading	
Blue, Light	(230)	Proposed Pavement Shading	
Pink, Dark	(13)	Temporary Pavement Shading	



Stage 2

LEGEND

◆

Single White Delineator

●

Channelizing Device

×

Drum

○➤

Traffic Signal

┆

Traffic Sign

⋮

Type III Barricade

←

Direction of Traffic

—

Safety Closure

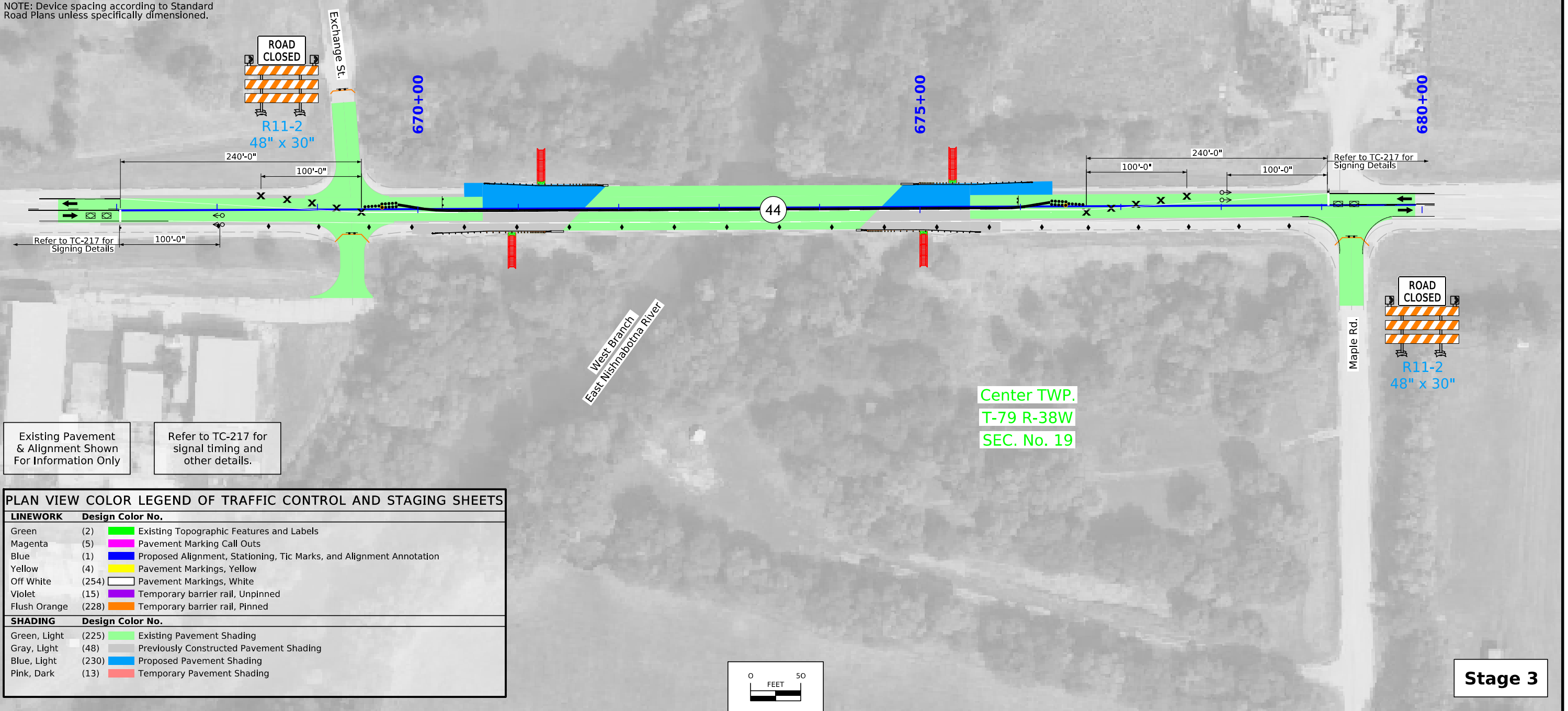
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Vehicle Detection Area

●●●●●

Temporary Crash Cushion

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

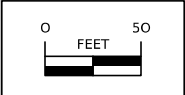


Existing Pavement
& Alignment Shown
For Information Only

Refer to TC-217 for
signal timing and
other details.

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Magenta	(5)	Pavement Marking Call Outs
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Yellow	(4)	Pavement Markings, Yellow
Off White	(254)	Pavement Markings, White
Violet	(15)	Temporary barrier rail, Unpinned
Flush Orange	(228)	Temporary barrier rail, Pinned
SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Blue, Light	(230)	Proposed Pavement Shading
Pink, Dark	(13)	Temporary Pavement Shading



Stage 3

LEGEND

◆

Single White Delineator

●

Channelizing Device

✕

Drum

○➤

Traffic Signal

┆

Traffic Sign

⋮

Type III Barricade

←

Direction of Traffic

—

Safety Closure

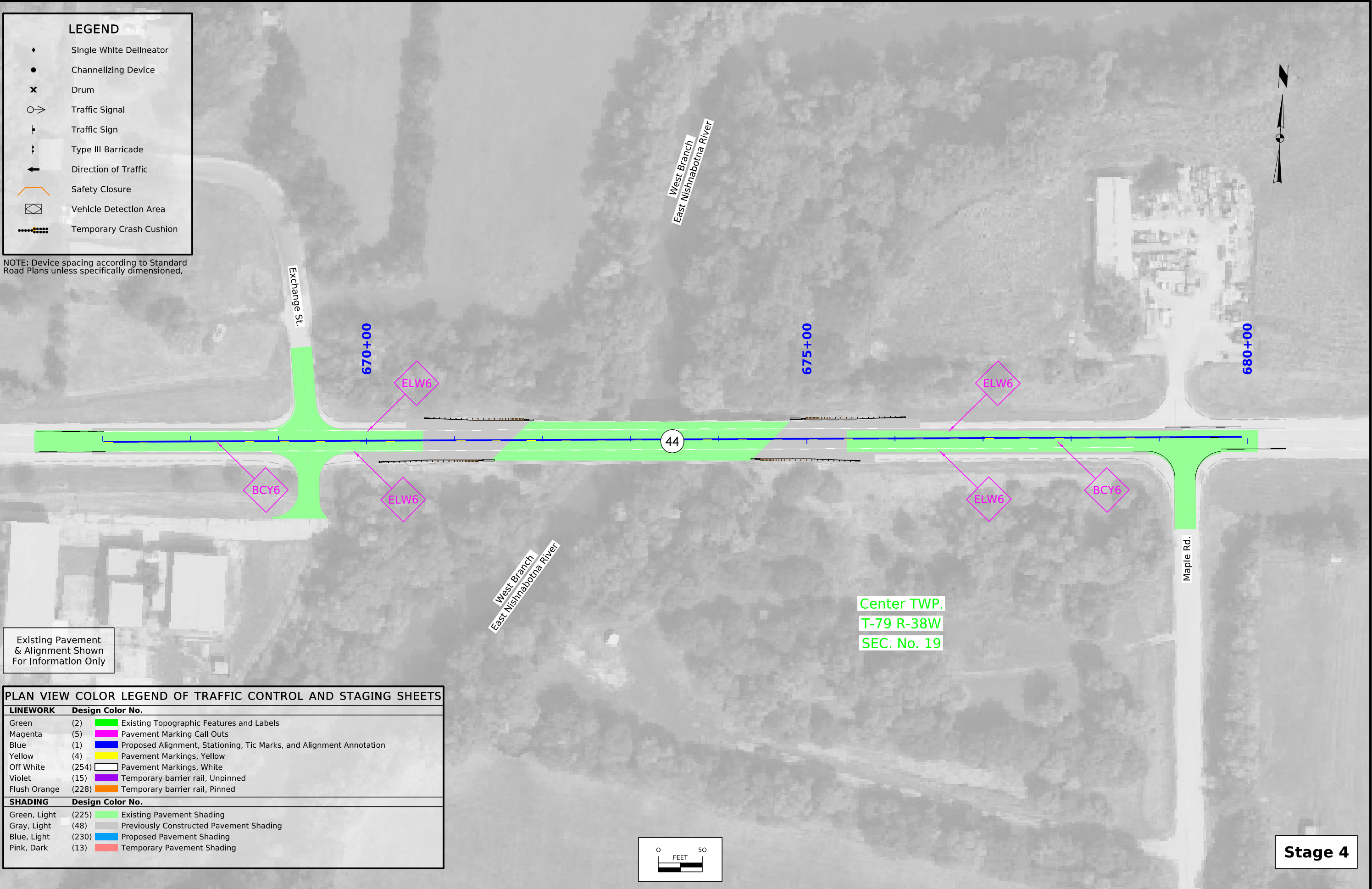
▢

Vehicle Detection Area

●●●●●

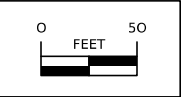
Temporary Crash Cushion

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

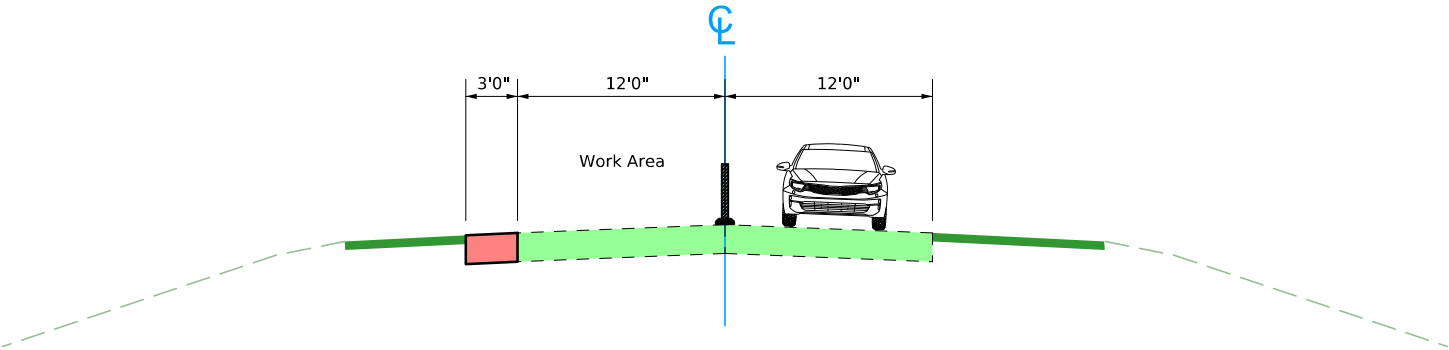


Existing Pavement & Alignment Shown For Information Only

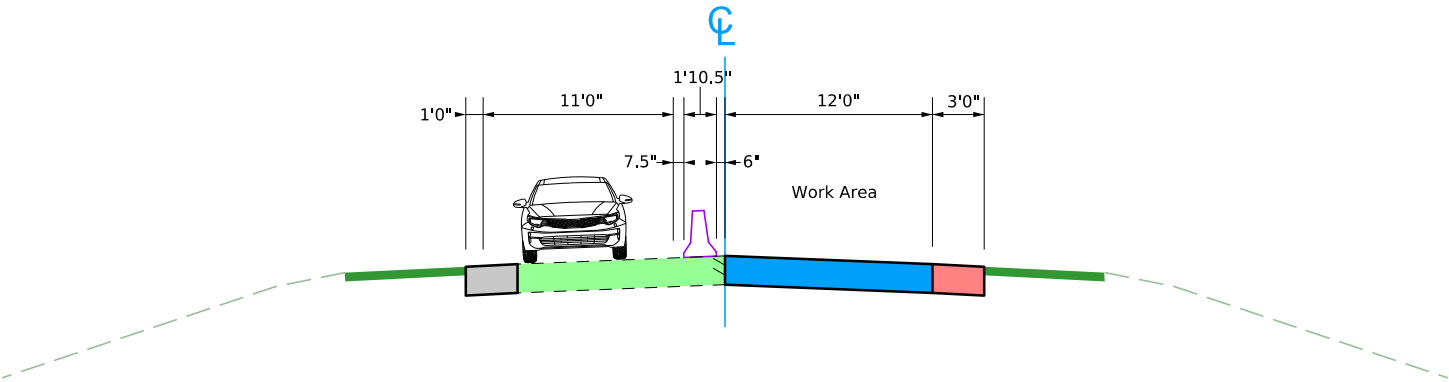
PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS			
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Magenta	(5)	Pavement Marking Call Outs	
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Yellow	(4)	Pavement Markings, Yellow	
Off White	(254)	Pavement Markings, White	
Violet	(15)	Temporary barrier rail, Unpinned	
Flush Orange	(228)	Temporary barrier rail, Pinned	
SHADING		Design Color No.	
Green, Light	(225)	Existing Pavement Shading	
Gray, Light	(48)	Previously Constructed Pavement Shading	
Blue, Light	(230)	Proposed Pavement Shading	
Pink, Dark	(13)	Temporary Pavement Shading	



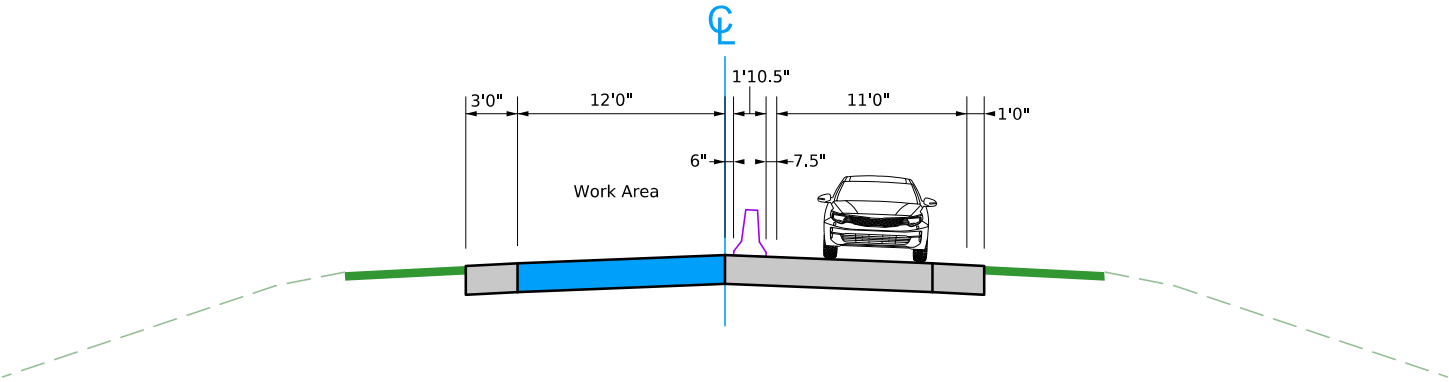
Stage 1



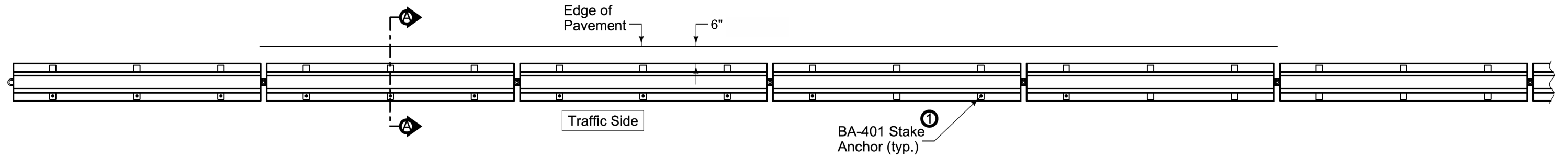
Stage 2



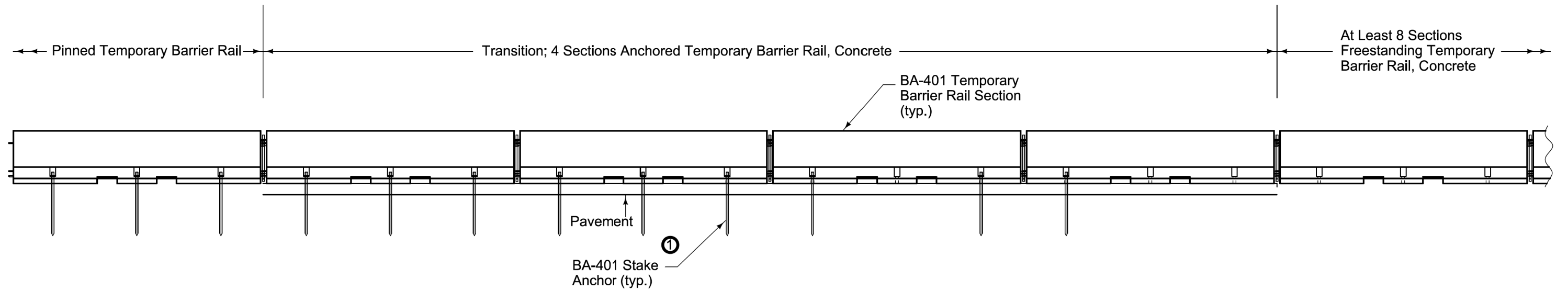
Stage 3



PLAN VIEW COLOR LEGEND OF STAGING SHEETS			
SHADING	Design Color No.		
Green, Light	(225)	Existing Pavement Shading	
Green, Dark	(233)	Existing Granular Shoulder Shading	
Gray, Light	(48)	Previously Constructed Pavement Shading	
Blue, Light	(230)	Proposed Pavement Shading	
Pink, Dark	(13)	Temporary Pavement Shading	



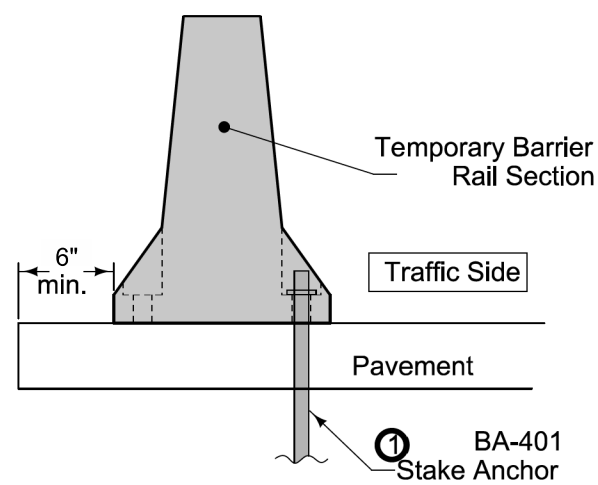
PLAN



ELEVATION

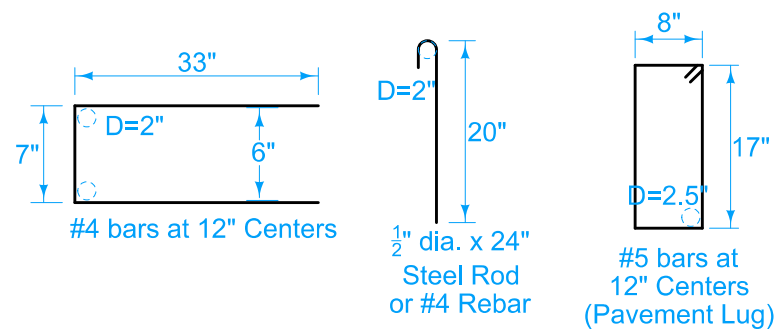
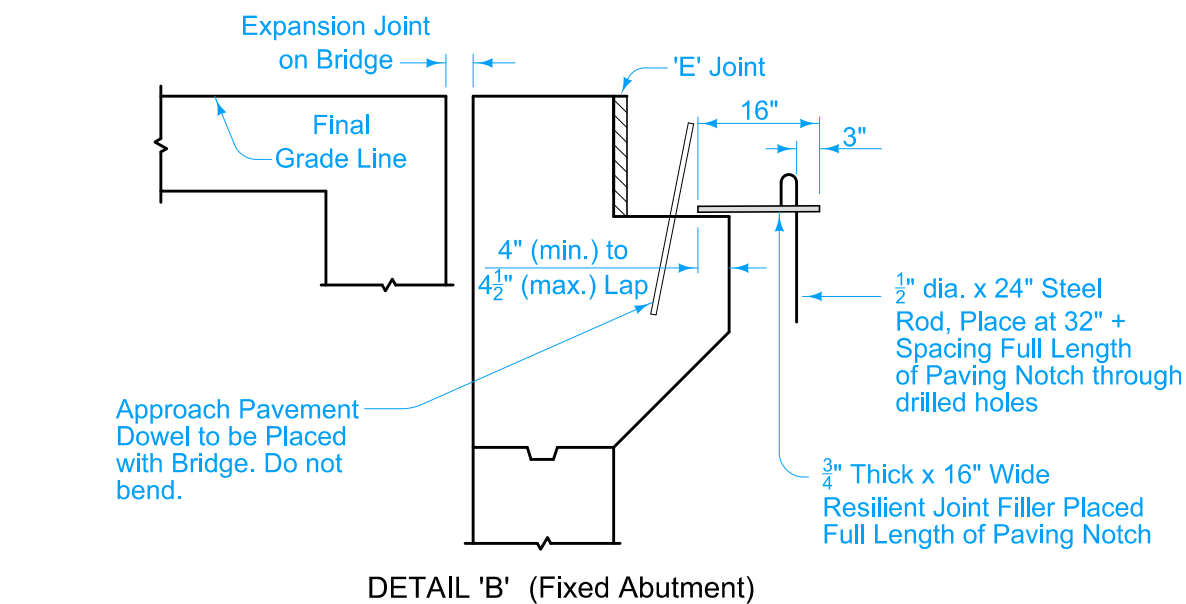
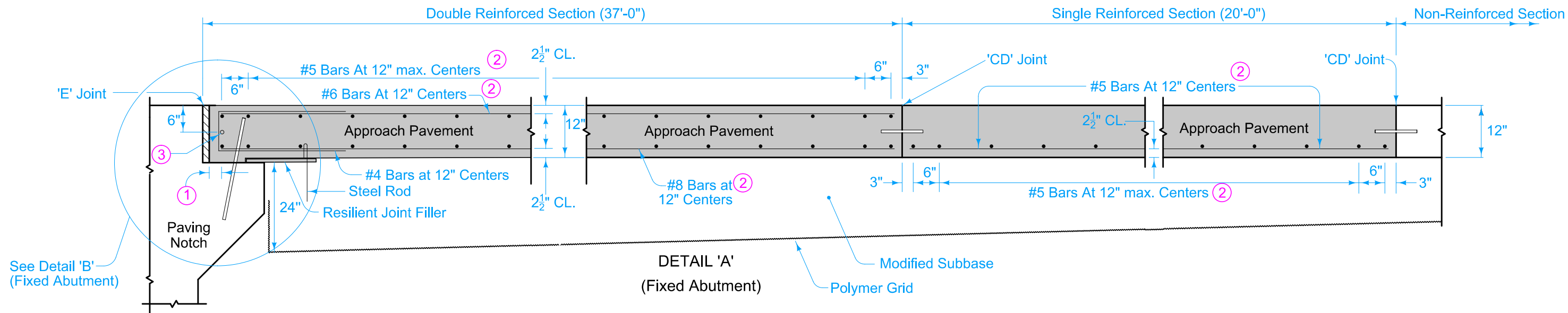
Install temporary barrier rail on a flat, level surface. Where anchored TBR sections are not located on existing pavement, construct a 2 inch minimum thickness HMA pad.

- ① Each transition requires nine (9) BA-401 stake anchors as shown. Use of the strap anchorage is not allowed in transition. When transition is placed on Composite or PCC Pavement pre-drill holes for stakes with 1 $\frac{5}{8}$ inch core bit.



SECTION A-A

Transition from
Pinned TBR to
Unpinned TBR



BENT BAR SHAPES

For joint details, refer to PV-101.

For curb details, see Detail 'G'.

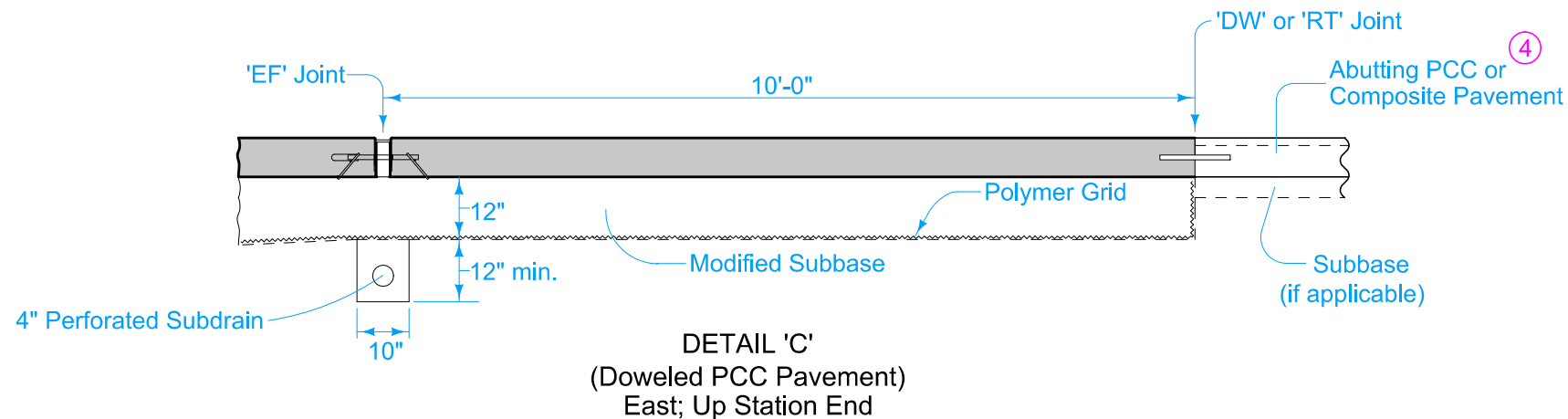
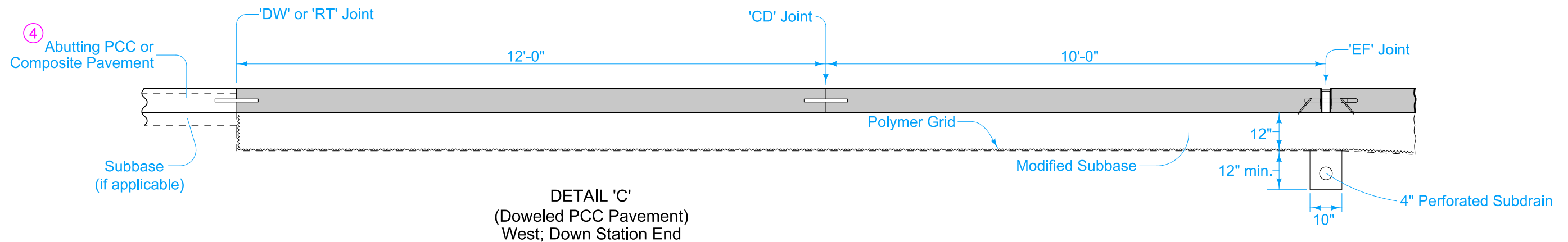
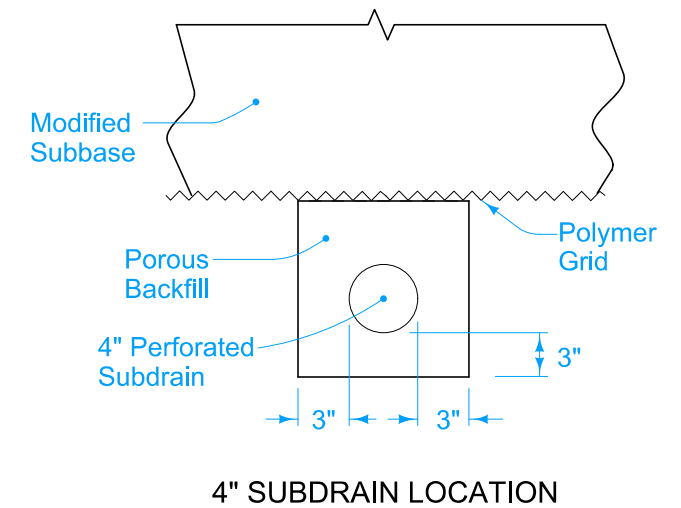
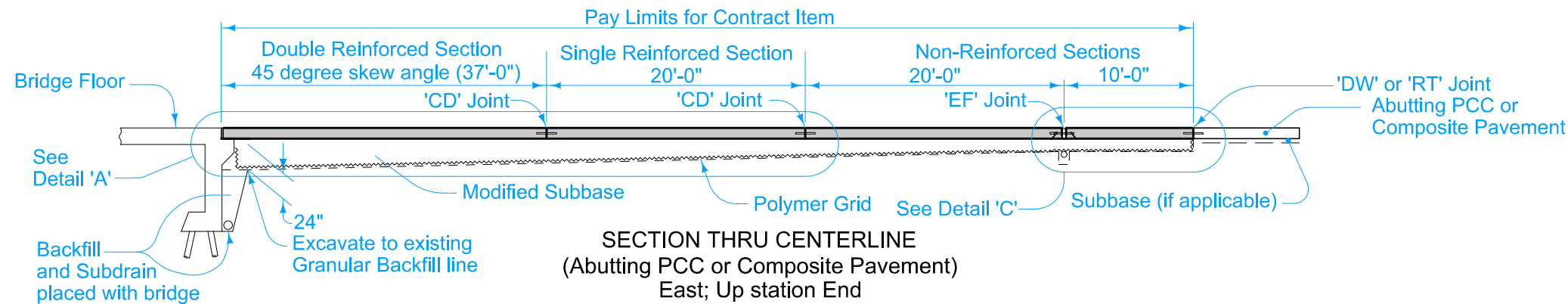
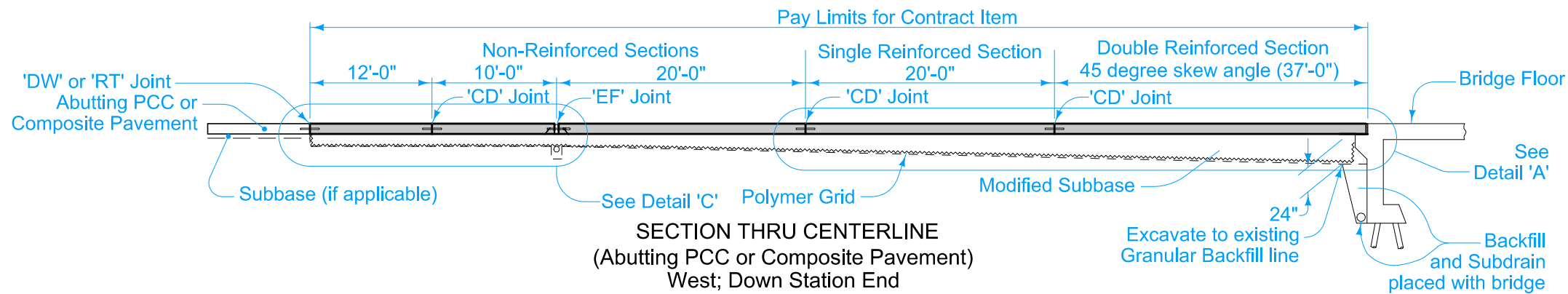
All transverse bars are #5.

Possible Contract Item:
Bridge Approach, BR-203
Longitudinal Grooving in Concrete,
Bridge Deck and/or Approaches

Possible Tabulation:
112-6

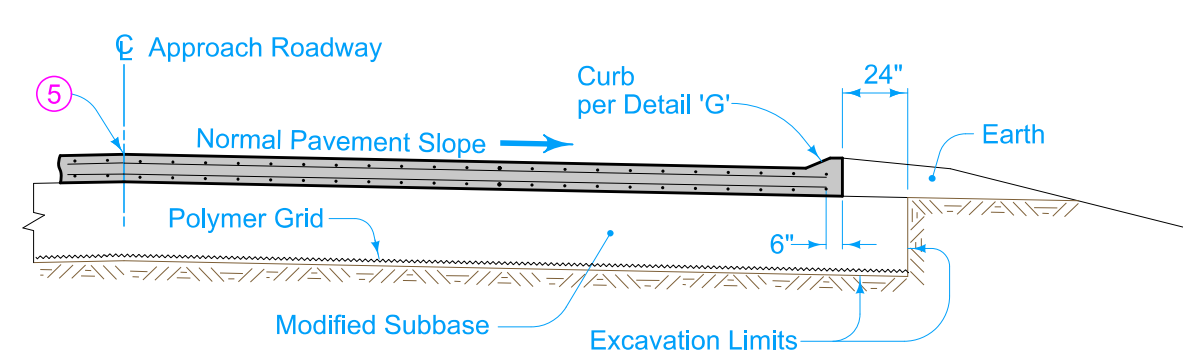
- ① 2" min. to 2 1/2" max. clear to bent bar.
- ② Minimum lap length: #5 Bars - 18"
#6 Bars - 27"
#8 Bars - 48"
- ③ If bridge is skewed, place additional #5 bar parallel to skewed face.

MODIFIED	6-16-26
	BR-203
STANDARD ROAD PLAN	SHEET 1 of 3
MODIFICATIONS: Modified for multiple non-reinforced lengths.	
APPROVED BY DESIGN METHODS ENGINEER	
DOUBLE REINFORCED 12" APPROACH	

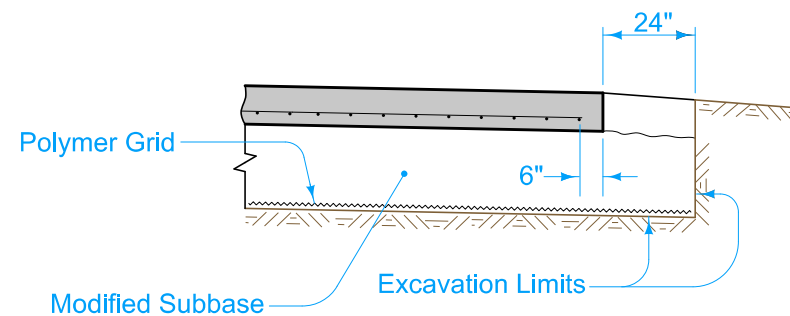


4 If abutting pavement (PCC or HMA) is not in place, refer to BR-213.

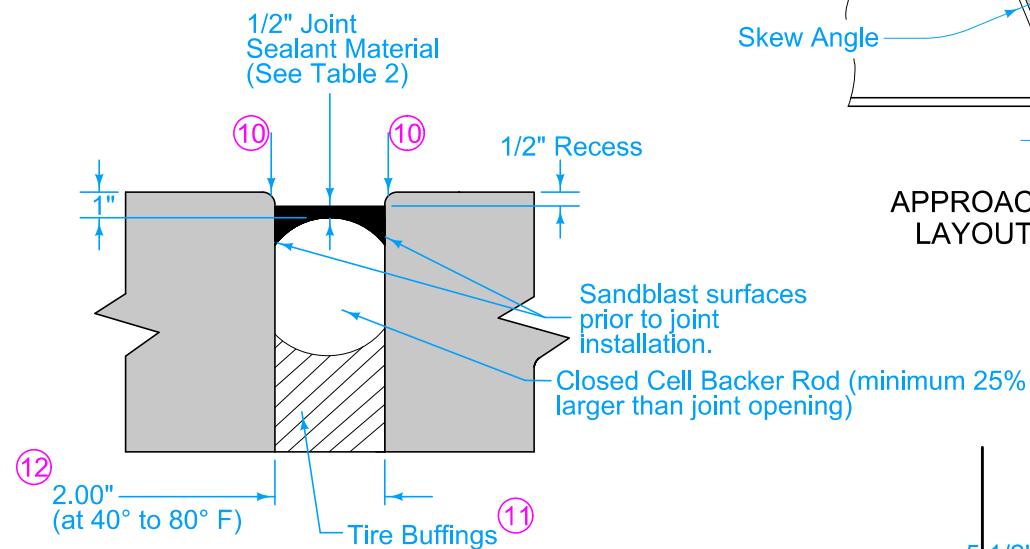
MODIFIED	6-16-26
	BR-203
STANDARD ROAD PLAN	SHEET 2 of 3
MODIFICATIONS: Modified for multiple non-reinforced lengths.	
APPROVED BY DESIGN METHODS ENGINEER	
DOUBLE REINFORCED 12" APPROACH	



SECTION A-A

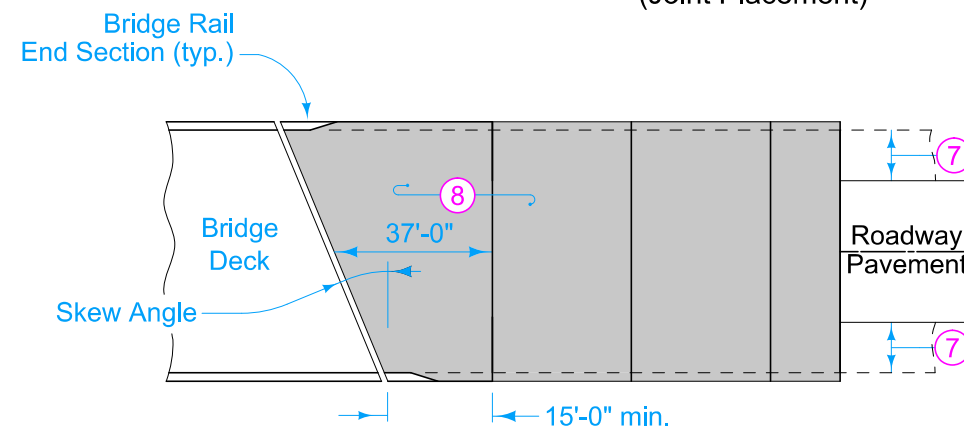


SECTION B-B

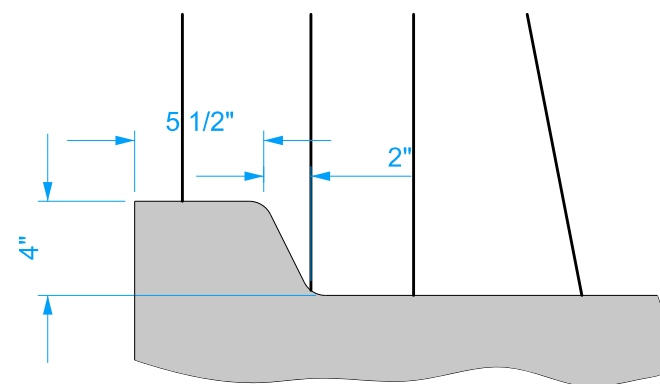


'BE' JOINT DETAIL

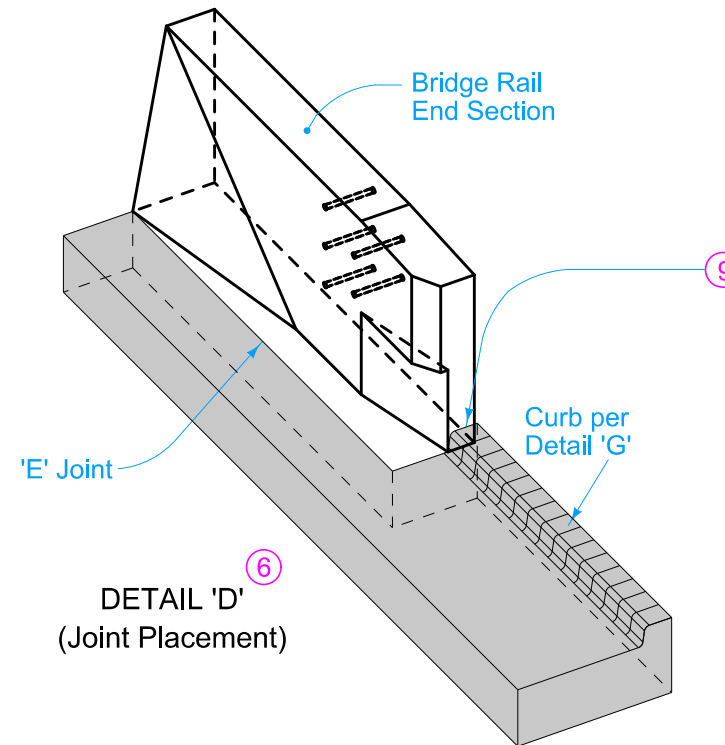
Table 2
Approved List of Sealant
Dow - Dowsil 902 RCS
Sika - Sikasil 728 RCS
Watson Bowman Acme - Wabo SiliconeSeal
Pecora - 322FC



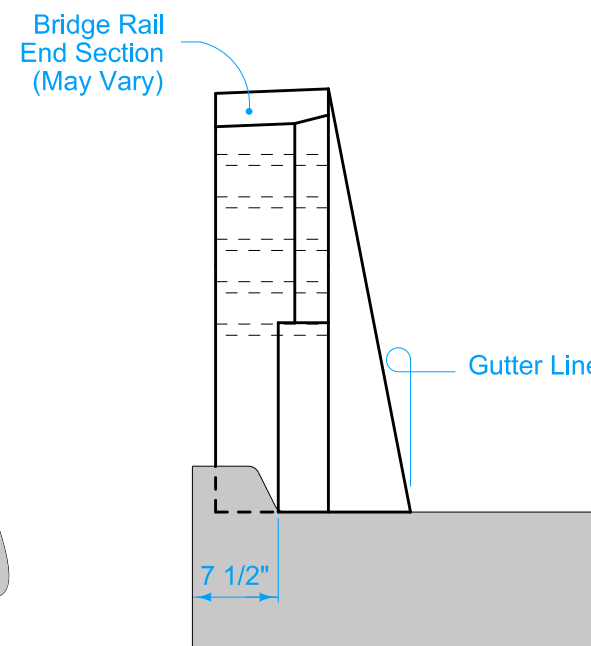
APPROACH PAVEMENT LAYOUT AT A SKEW



DETAIL 'G'



DETAIL 'D'
(Joint Placement)



DETAIL 'E'

- ⑤ Longitudinal Joint (PV-101):
Single pour - Saw cut joint per Detail B.
Two pours - Use 'BT-2' Joint.
- ⑥ Refer to BR-211, BR-212, or BR-231.
- ⑦ Design shoulder width.
- ⑧ Reinforced bridge approach section.
- ⑨ Joint at end of Bridge Rail End Section: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.
 - Fixed Abutment Bridges: Type 'E' Joint.
 - Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler complying with Section 4136 of the Standard Specifications. Set width of gap to 2 inches. Joint length as required to completely fill from back side of curb to front face of bridge wing.
- ⑩ Edge with 1/4 inch tool for length of joint indicated if formed edging not required when cut with diamond blade saw.
- ⑪ Compact tire buffings by spading with a square-nose shovel. Tire buffings shall not be larger than 1/2 inch.
- ⑫ Setting Width Notes:
 - Width is perpendicular to abutment.
 - Temperature of concrete deck on the underside or shaded portion of the deck shall be between 40 to 80 degrees Farenheit when placing approach slab concrete.
 - This 'BE' joint and the setting temperatures may be used for all concrete beam or slab bridges up to 575' in length and for all steel girder bridges up to 400' in length.

MODIFIED STANDARD ROAD PLAN	6-16-26
	BR-203
SHEET 3 of 3	
MODIFICATIONS: Modified for multiple non-reinforced lengths.	
APPROVED BY DESIGN METHODS ENGINEER	
DOUBLE REINFORCED 12" APPROACH	

Estimated Bridge Repair Quantities and Reference Notes - Design 227					
Item No.	Item Code	Item	Unit	Quantities Estimated	Estimate Reference Notes
1	2401-6750001	REMOVALS, AS PER PLAN	LS	1	Includes all work for removal and off-site disposal of abutment backwalls, wingwalls, portions of the barrier rails, portions of the deck, concrete abutment diaphragms, and expansion joints at the near and far ends of the bridge. 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.
2	2403-0100000	STRUCTURAL CONCRETE (MISCELLANEOUS)	CY	32.0	Includes all resilient joint filler required.
3	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	2,269	Includes all mechanical splices required. Includes setting dowel bars in drilled holes.
4	2413-1200000	STEEL EXTRUSION JOINT WITH NEOPRENE	LF	127.0	Includes all necessary hardware and accessories including the anchorage system, temporary erection material and the 3/8"" barrier plates with their anchorage system. Excludes installation of neoprene gland.
5	2413-1200100	NEOPRENE GLAND INSTALLATION AND TESTING	LF	127.0	Includes installation of neoprene gland and water testing of joint.
6	2499-0800000	PAVING NOTCH REPLACEMENT	LF	124.5	Includes 8.7 cu yd of Structural Concrete Class C, 1,992 lbs of epoxy-coated reinforcing steel, excavation, removing and disposing of the existing paving notch and concrete removed to form the shear keyways, drilling holes for dowel bars, polymer grout material, and materials for mechanical splice assemblies. See plan details for additional information.
7	2533-4980005	MOBILIZATION	LS	1	----

General Notes:

This design is for repairs to the existing 288'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge on IA 44 over West Nishnabotna River. Electronic copies of original design plans will be made available to the Contractor as part of the e-files supplied with the contract documents. See Design Sheet No. 2 for list of repair items.

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

Faint lines on plans indicate existing structure.

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.

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

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

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

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

All new or existing epoxy reinforcing that is field trimmed shall be repaired with an approved repair/patch compound per Materials I.M. 451.03B, Appendix B.

Construction shall be done in stages with at least one lane traffic maintained at all times in accordance with "Traffic Control Plan" note.

Construction Stages 1 & 2 as detailed on these plans may be reversed at the Contractor's option subject to the Engineer's approval.

The lump sum bid for "Removals, as Per Plan" shall include all costs associated with removing the existing expansion joints, including barrier plates; and portions of the deck, barrier rails, barrier plates, wingwalls and abutment backwalls. 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.

It is the intent of this design to reuse the existing pretensioned prestressed concrete beams in the new construction. The Bridge Contractor is to use extreme care when removing the deck concrete to avoid damage to the existing beams.

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

The Bridge Contractor is to provide a method of removal that will prevent feather edging at the bottom of the existing deck. Care shall be taken when exposing existing reinforcing so the bond to existing concrete is not broken at the concrete break lines.

The tops of 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 with the proper crown. The Contractor may elect to use formwork which is marked or trimmed to the correct elevation and crown to provide the limits for the hand finishing.

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

Two scrape samples were taken from areas of this bridge to get an indication of the existence of and level of total lead and total chromium. These two samples were taken at the abutment bearing (2021) and the expansion plate (2021). Analysis of total lead on the first sample (Abutment bearing) was 1,370 parts per million (ppm). Analysis of total lead on the second sample (Expansion plate) was 1,580 parts per million (ppm). Analysis of total chromium on the first sample was 52.3 ppm. Analysis of total chromium on the second sample was 29.9 ppm. These analyses show the existence of these two toxic constituents. Levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other constituents were analyzed. The Bidder should not rely on the Iowa DOT's testing and analysis for any purpose other than as an indication of the existence of these two toxic constituents.

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	Steel Extrusion Expansion Device	(502)_Shelby_Design227_SteelExtrusionDevice.pdf	No
2	Barrier Plate	(502)_Shelby_Design227_BarrierPlate.pdf	No
No.	Calculation Description	Calculation File Name Convention For Submittal	Certified by Iowa P.E. (Yes/No)

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.

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO Standard Specifications for Highway Bridges, Series of 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 Section 10. ASTM A709 Grade 36 (AASHTO M270 Grade 36).

Design History at this Site

(Includes this Design)	
Des. No.	Type of Work
1875	Original Design
227	Deck Joint Repair

Note:
Roadway Quantities are shown elsewhere in these plans.

Note:
The roadway will be open to thru traffic. Refer to the traffic control plan shown elsewhere in these plans.

Design For Repair To 45° Skew (L.A.)

288'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

95'-9" End Spans96'-6" Interior Span

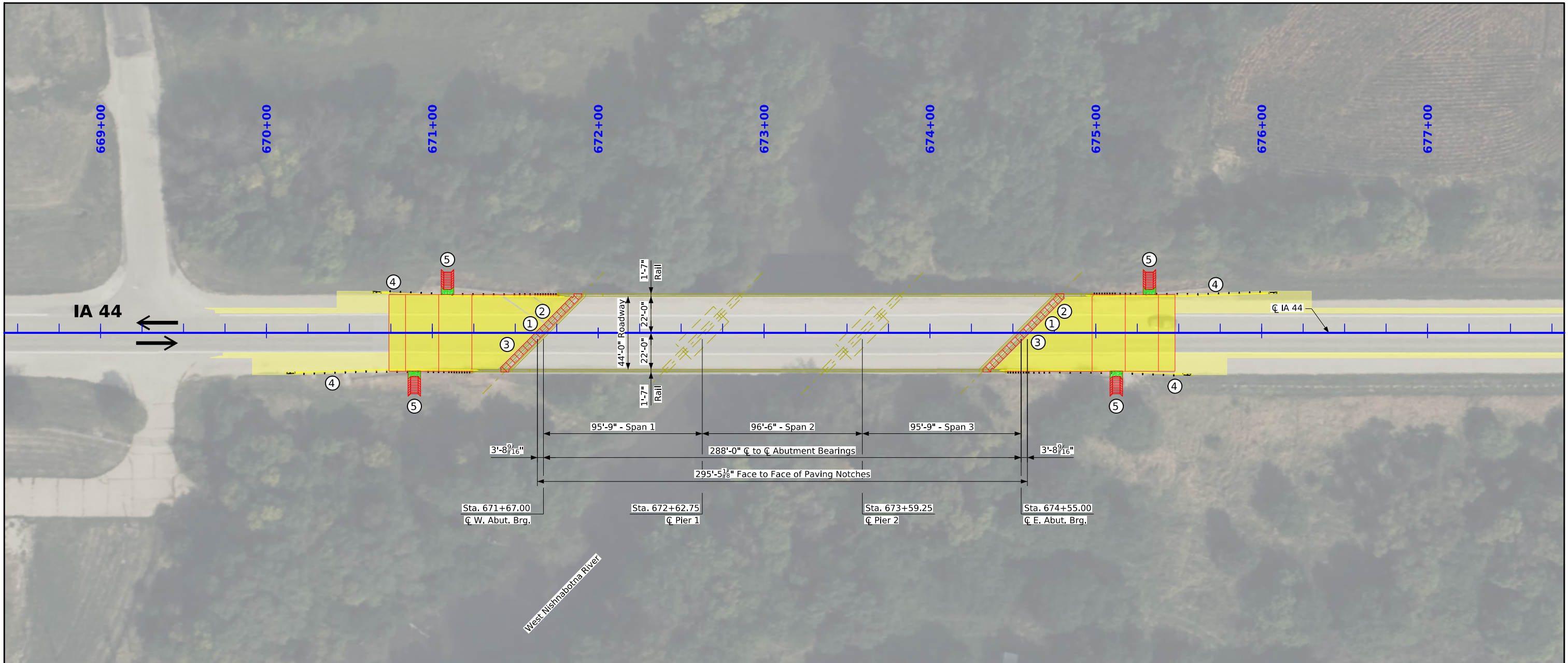
General Notes and Quantities

STA. 673+11.00 (IA 44)Turn-in Date: October 2026

Shelby County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 227Design Sheet No. 1 of 8FHWA No. 48001



Repairs Shall Consist Of:

- 1. Replace sliding plate joint with strip seal joints at both abutments.
- 2. Replace 10" paving notch with retrofit paving notches at both abutments.
- * 3. Remove and replace approach pavement on both ends of bridge.
- * 4. Remove and replace guardrail on all corners of the bridge. Pave the shoulders in front of the guardrail.
- * 5. Install bridge end drains (rock flumes) at each corner of the bridge.
- * Refer to Roadway Plans for additional information.

Location

IA 44 Over West Nishnabotna River
In the City of Harlan
T-79N R-38W
Section 19
Center Township
Shelby County
FHWA No. 48001
Bridge Maint. No. 8322.3S044
Latitude 41.645484°
Longitude -95.313071°



Design For Repair To 45° Skew (L.A.)

288'-0" x 44'-0" Pretensioned
Prestressed Concrete Beam Bridge

95'-9" End Spans96'-6" Interior Span

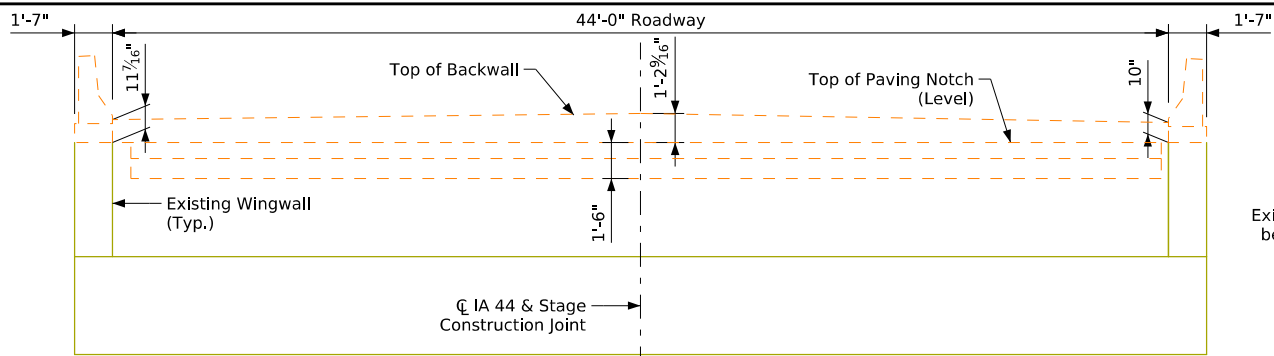
Situation Plan

STA. 673+11.00 (IA 44)Turn-in Date: October 2026

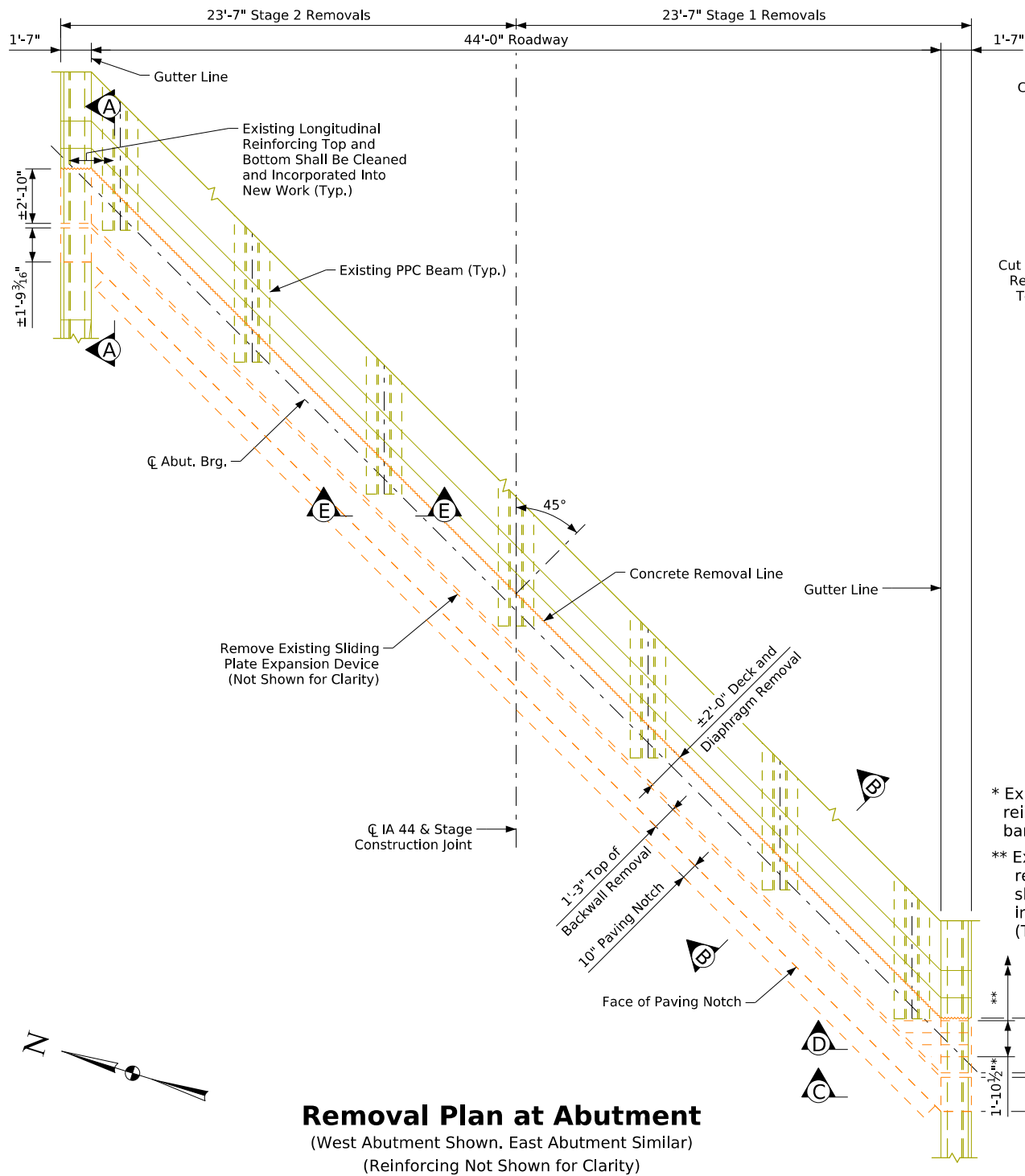
Shelby County

IOWA DEPARTMENT OF TRANSPORTATION

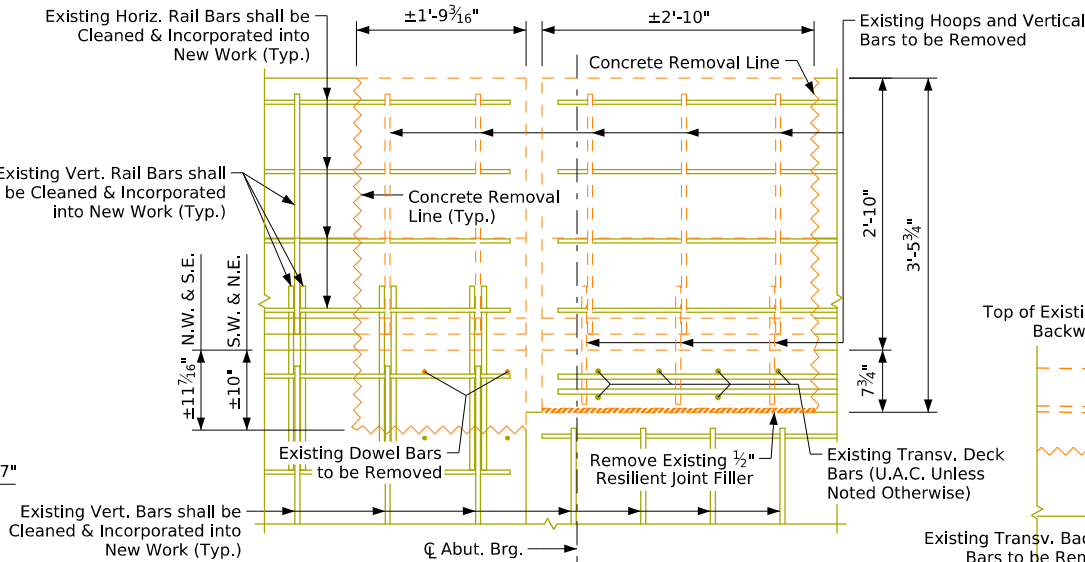
Design No. 227Design Sheet No. 2 of 8FHWA No. 48001



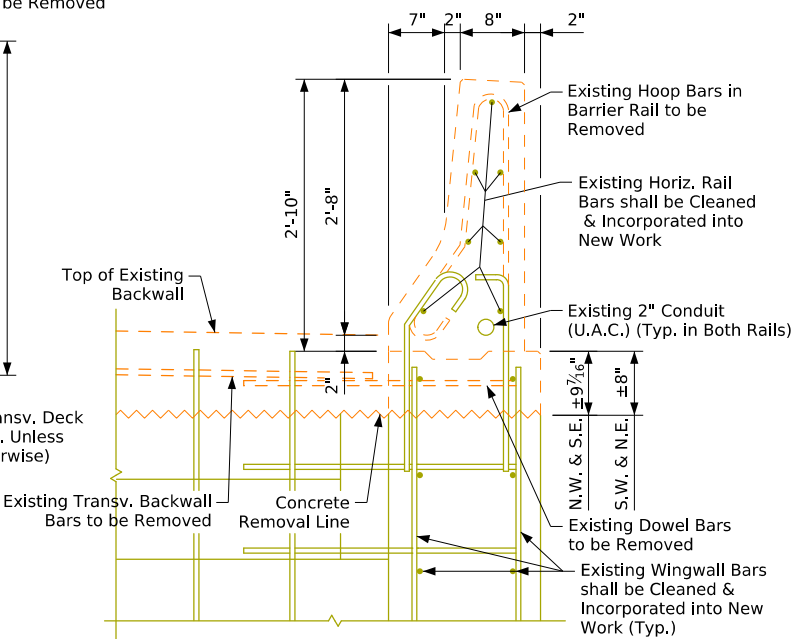
Rear Elevation of Abutment
(West Abutment Shown. East Abutment Similar)
(Reinforcing Not Shown for Clarity)



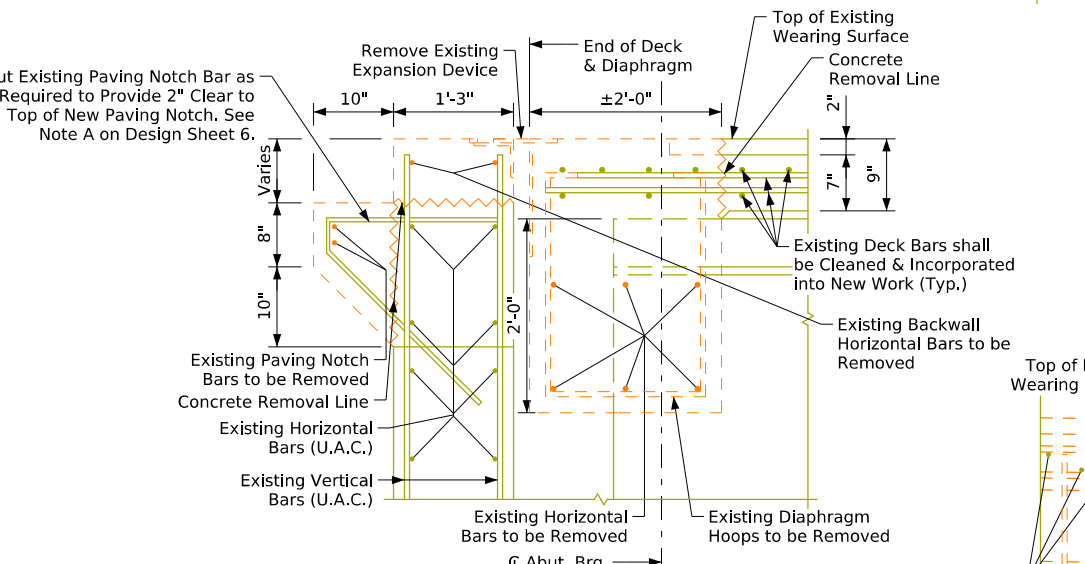
Removal Plan at Abutment
(West Abutment Shown. East Abutment Similar)
(Reinforcing Not Shown for Clarity)



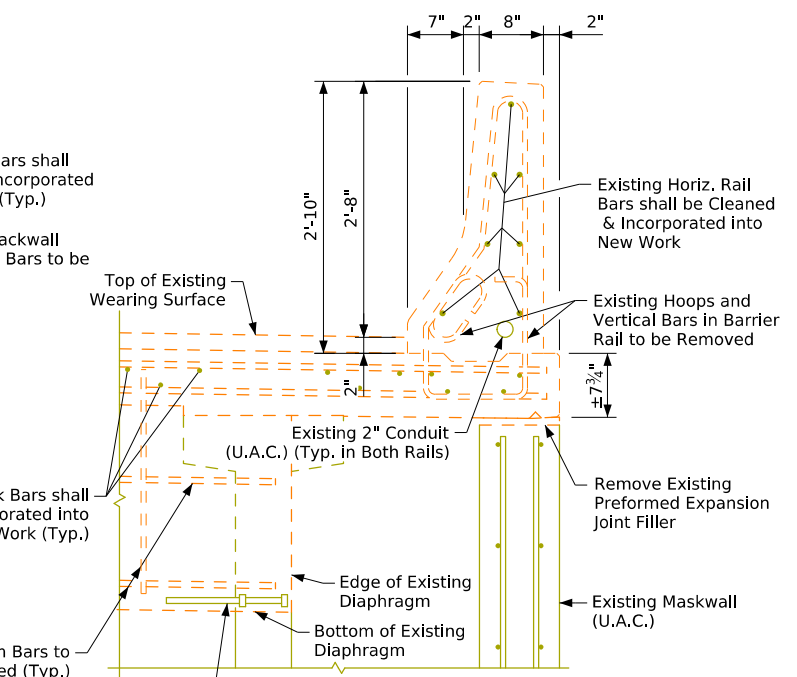
Section A-A



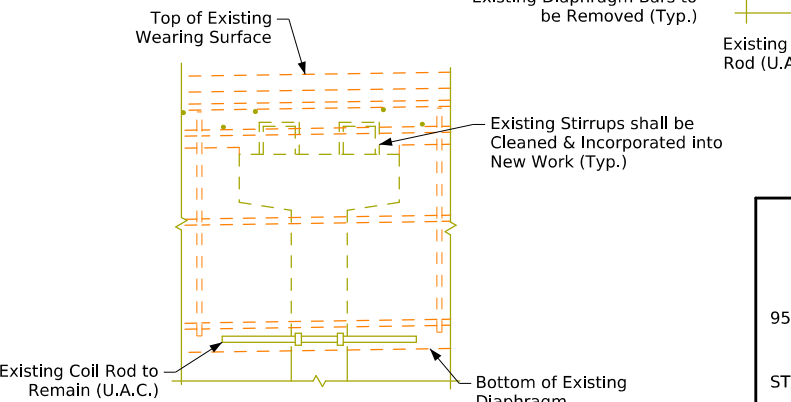
Section C-C



Section B-B



Section D-D



Section E-E

* Existing transverse deck reinforcing top and bottom bars to be removed
** Existing transverse deck reinforcing top and bottom shall be cleaned and incorporated into new work (Typ.)

Design For Repair To 45° Skew (L.A.)
288'-0" x 44'-0" Prestressed Concrete Beam Bridge
95'-9" End Spans 96'-6" Interior Span
Abutment & Barrier Removal Details
STA. 673+11.00 (IA 44) Turn-in Date: October 2026
Shelby County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 227 Design Sheet No. 3 of 8 FHWA No. 48001

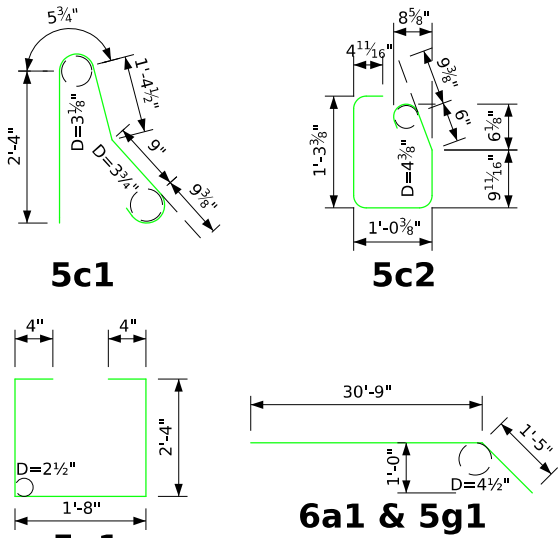


The 6a1, 6d1, 5g1, 5m1 and 5m2 bars in the abutment backwalls, deck, diaphragm and paving notch shall be spliced at the locations shown using mechanical splice assemblies. Mechanical splice assemblies consist of mechanical splicers and reinforcing splice bars as required to facilitate the use of the mechanical splicer. The mechanical splice assembly used shall meet the requirements of Materials I.M. 451 Appendix E. Reinforcing splice bars shall match the diameter of the bar being spliced.

All mechanical splice assemblies shall be epoxy coated.

The cost of all splice assemblies is to be included in the price bid for "Reinforcing Steel Epoxy Coated" and no separate payment will be made. The weight of mechanical splice assemblies is not included in the quantity shown for "Reinforcing Steel Epoxy Coated". A total of 20 epoxy coated splice assemblies will be required.

Bent Bar Details



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

Epoxy Coated Reinforcing Steel - Both Abut.

Bar	Location	Shape	No.	Length	Weight
6a1	Deck Transverse, Bent		8	32'-2"	387
6a2	Deck Transverse, Top and Bottom		4	1'-11"	12
6a3	Deck Transverse, Top		2	2'-7"	8
6a4	Deck Transverse, Top and Bottom		4	3'-3"	20
6a5	Deck Transverse, Top		2	3'-11"	12
5c1	Rail Vertical		20	5'-9"	120
5c2	Rail, Deck Hoop		12	4'-7"	57
6d1	Diaphragm Longitudinal Bar		8	28'-10"	346
6d2	Diaphragm Longitudinal Bar		48	8'-4"	601
5e1	Diaphragm Hoops		60	7'-0"	438
5g1	Backwall, Longitudinal Bent Bar		8	32'-2"	268
				Total (lbs.)	2,269

Design For Repair To 45° Skew (L.A.)		
288'-0" x 44'-0" Pretensioned		
Prestressed Concrete Beam Bridge		
95'-9" End Spans		96'-6" Interior Span
Abutment & Barrier Repair Details		
STA. 673+11.00 (IA 44)		Turn-in Date: October 2026
Shelby County		
IOWA DEPARTMENT OF TRANSPORTATION		
Design No. 227	Design Sheet No. 5 of 8	FHWA No. 48001
	SHEET NUMBER V.5	

Paving Notch Replacement Notes:

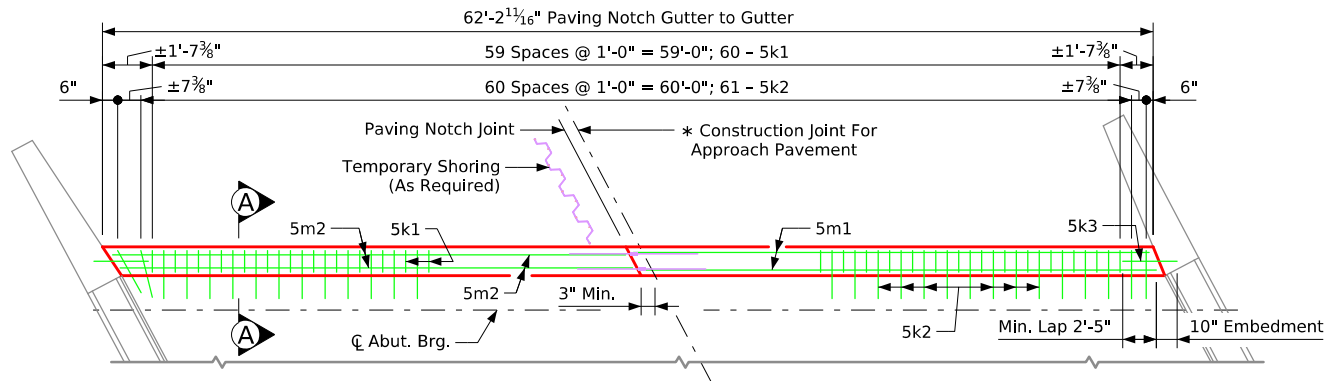
The Paving Notch Replacement is to be Class "C" structural concrete. Minimum clear distance from face of concrete to near reinforcing bar is to be 2", unless otherwise noted or shown.

The bid item "Paving Notch Replacement" linear feet, shall include all costs of labor and materials associated with excavation, removing, and disposing of the existing paving notch, temporary shoring, granular backfill and compaction as needed, and installing the new paving notch. This work shall include, cutting of the existing #5 bars, removing the concrete for the shear keyways, drilling the holes for the deformed dowels, and constructing the new notch to the dimensions shown. The new notch is estimated at 0.07 cubic yards per foot of structural concrete and 16.0 pounds of epoxy coated reinforcing steel per foot.

Removals shall be in accordance with Section 2401, of the Standard Specifications.

Dowel Setting Note:

The deformed 5k2 & 5k3 bars shall be set as dowels in drilled holes. Holes are to be 10" deep. Polymer grout system shall be used to install the deformed dowel bars in accordance with Article 2301.03,E, of the Standard Specifications and the Grout Manufacturer's recommendations.

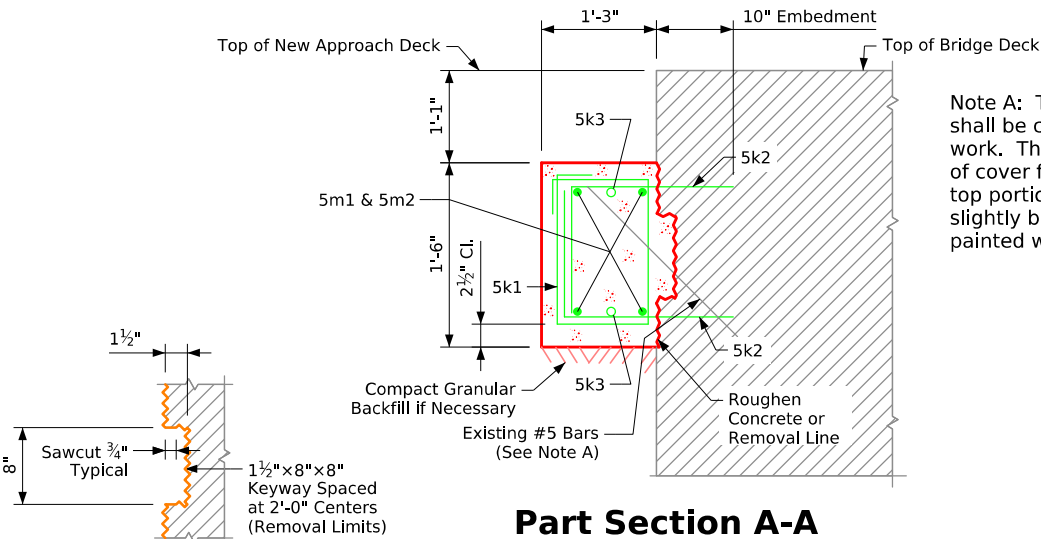
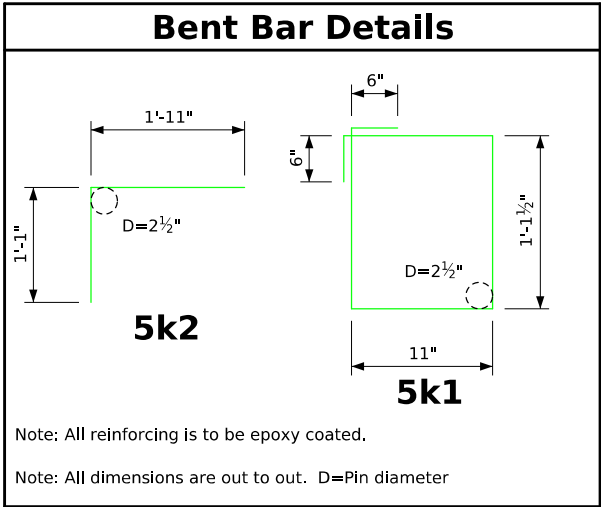


* Construction joint for notch repair to extend a minimum of 3 inches past construction joint for pavement. See Design Sheet No. 5 for Mechanical Splice Details.

Note: 5k3 bars shall be set as dowels embedding 10 inches minimum into the existing bridge wingwalls and extending a minimum of 2'-5" into the new paving notch replacement.

Part Plan View At Abutment

Note: New Paving Notch Replacement should extend from bridge wingwall to bridge wingwall.



Note A: The bottom portion of the existing #5 bars shall be carefully exposed and incorporated into new work. The bar shall be cut off to provide 2 inches of cover from the top of the new paving notch. The top portion of the bar shall be cut off flush or slightly below the concrete surface and the ends painted with 2 coats of zinc rich paint.

Part Section A-A

Note: Dowels shall be placed to miss any existing reinforcing steel exposed during removals.

1 1/2"x8" Keyway Detail

Design For Repair To 45° Skew (L.A.)

288'-0" x 44'-0" Prestressed

Prestressed Concrete Beam Bridge

95'-9" End Spans 96'-6" Interior Span

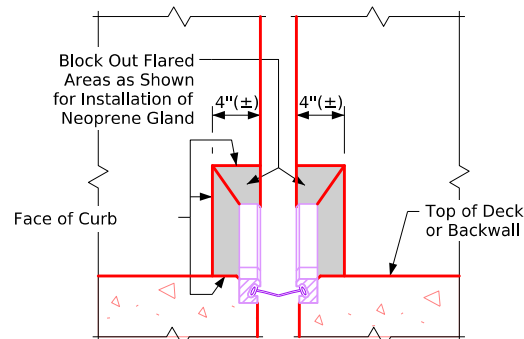
Paving Notch Replacement

STA. 673+11.00 (IA 44) Turn-in Date: October 2026

Shelby County

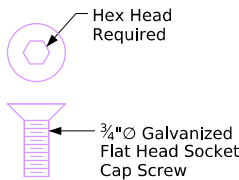
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 227 Design Sheet No. 6 of 8 FHWA No. 48001

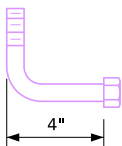


Blockout Detail

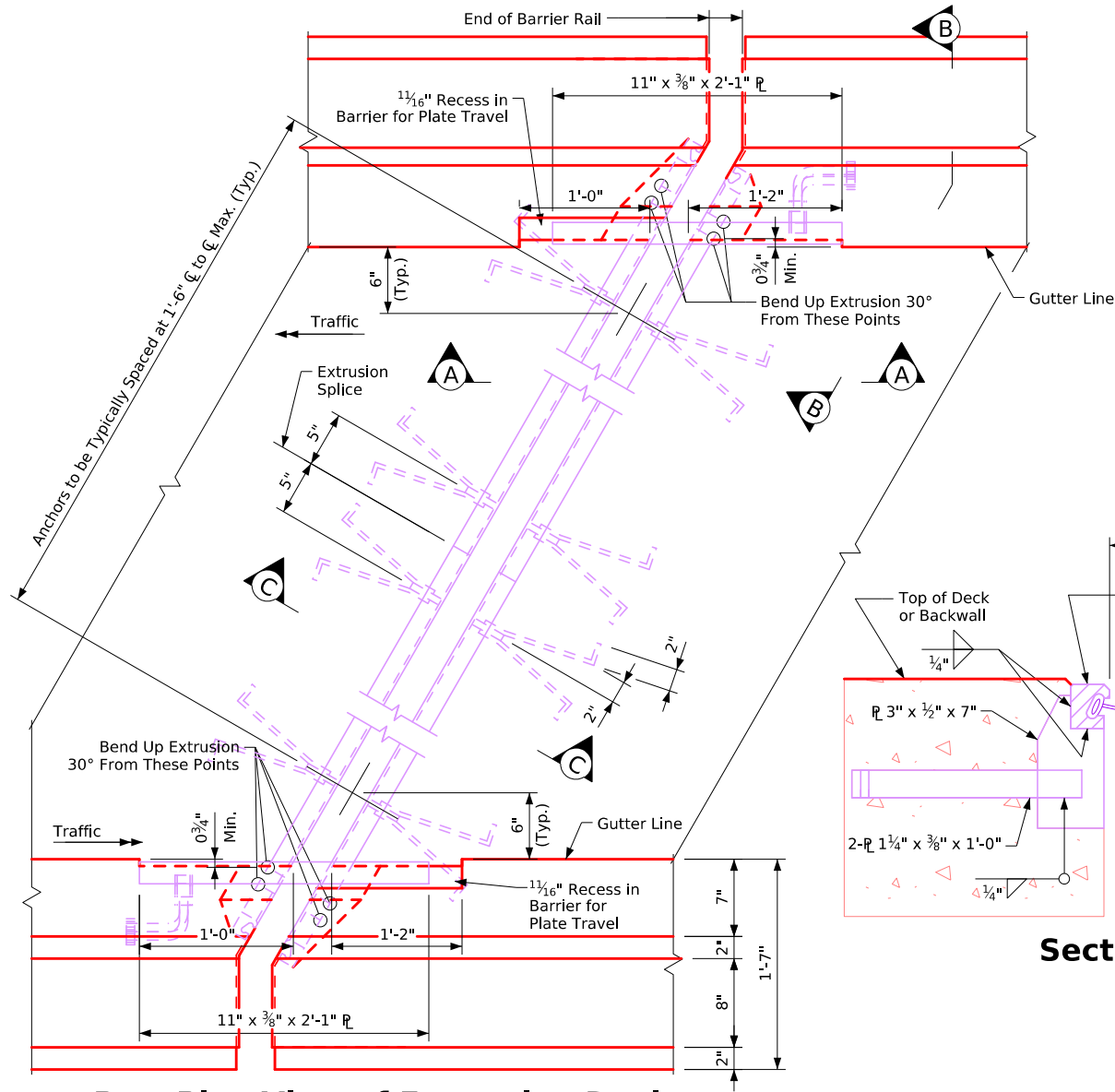
Contractor to note that the cap screw anchorage system for the 3/8" barrier plates are always to be placed on the oncoming traffic side.



Cap Screw Detail

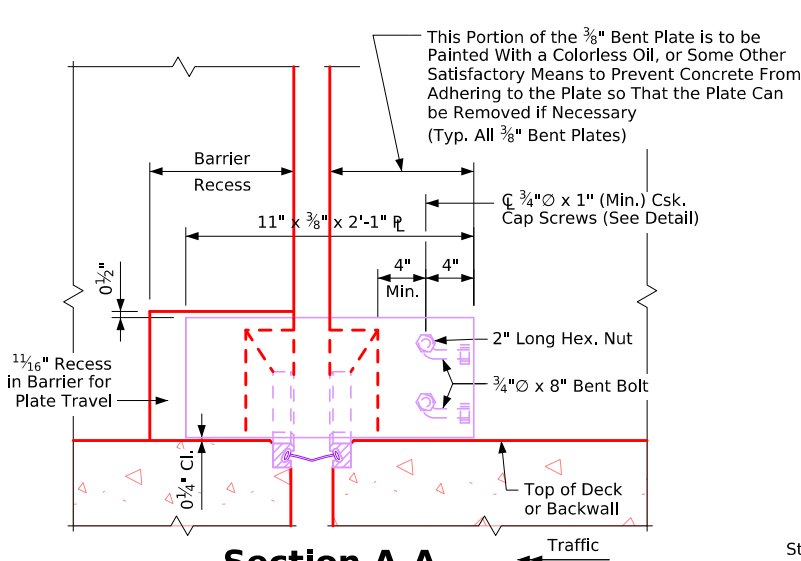


Bent Bolt Detail



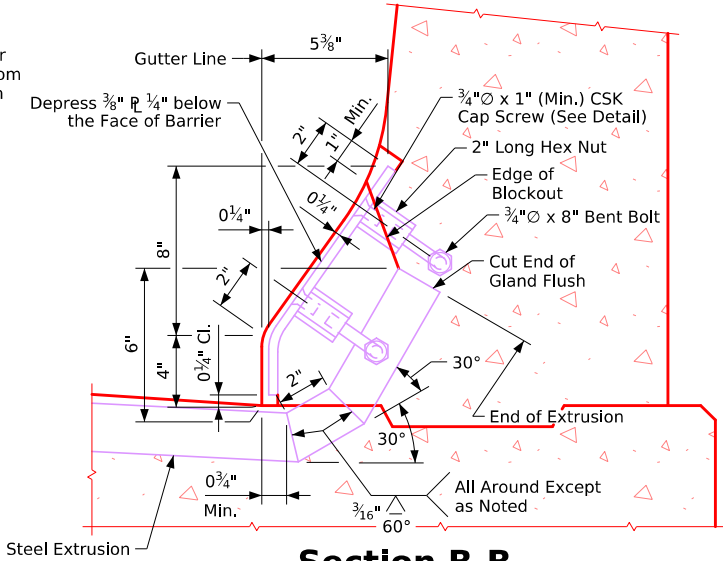
Part Plan View of Expansion Device
L.A. Skew

Note: It is intended that the 1 1/16" recessed area be formed so that when the 3/8" bent plate is installed the plate will be able to move freely in this recessed area.



Section A-A

(Drawn for 0° Skew for Illustrative Purposes)



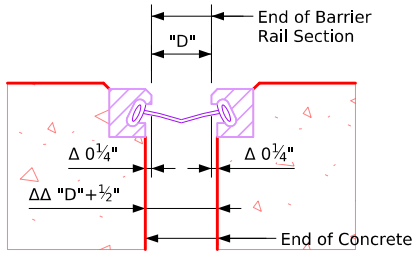
Section B-B

Barrier Plate Note:

The material used for the barrier plates is to be ASTM A36 steel. The bolts shall meet the requirements of ASTM A307. The plates, bolts, nuts and cap screws are to be galvanized in accordance with Article 4100.07 of the Standard Specifications.

Note: Joint settings for other temperatures are proportional. Temperatures shown are concrete deck temperatures on the underside or shaded portion of the deck.

East Abutment	1 3/16" at 90° F. 1 5/8" at 50° F. 2" at 10° F.
West Abutment	1 1/2" at 90° F. 1 11/16" at 50° F. 1 7/8" at 10° F.



Expansion Opening Detail

- Δ This dimension may vary slightly depending on manufacturer furnishing the joint.
- ΔΔ Used for all out to out dimensions of deck. The dimensions may vary slightly depending on manufacturer furnishing the joint.

Section C-C

Table of Approved Expansion Devices

Manufacturer	Type of Steel Extrusion	Neoprene Gland	Minimum Opening for Gland Installation	Corresponding Maximum Deck Temperature
Watson-Bowman & Acme Corp.	A	SE-300	1 1/2"	90°F (West) 60°F (East)
Approved Equivalent				

Note:
See Design Sheet No. 8 for expansion device notes containing the steel extrusion notes, neoprene gland notes, and watertight integrity testing and repair notes.

Design For Repair To 45° Skew (L.A.)
288'-0" x 44'-0" Prestressed Concrete Beam Bridge
95'-9" End Spans 96'-6" Interior Span
Expansion Device Details
STA. 673+11.00 (IA 44) Turn-in Date: October 2026
Shelby County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 227 Design Sheet No. 7 of 8 FHWA No. 48001

Steel Extrusion Notes:

The Contractor shall submit for approval shop drawings of the expansion devices showing layout, material to be used, and provisions for the holding device during placement of concrete.

The expansion device shall be galvanized after welding. All curb plates including their anchorages shall be galvanized.

The expansion device is to be parallel to grade.

Cap screws shall be countersunk 1/16" below top of the plate. The minimum grade of structural steel for the expansion device shall be ASTM A36.

Blockout details may be altered from those shown provided the gland may be installed and removed if necessary and the curb area remains watertight.

Shop splices of the steel extrusion will be permitted. Prior to making shop splices steel extrusion pieces shall have a minimum length of 15 feet. The individual length of pieces shall be chosen so that a minimum number of splices is required. All pieces shall be joined with a prequalified partial penetration single groove weld detailed on the shop drawing. All surfaces not in contact with concrete are to be ground flush. No weld shall be permitted in the internal section of the extrusion where the neoprene gland is to be installed.

The number of feet of steel extrusion installed shall be paid for at the contract price per foot based on plan quantities. The price bid for "Steel Extrusion Joint w/Neoprene" shall include the cost of furnishing but not the cost of installing the neoprene gland. The contract price bid for "Steel Extrusion Joint w/Neoprene" shall be full compensation for furnishing and installing steel extrusions. This work will consist of furnishing all required materials, (including the 3/8" plates at the curbs and their anchorage systems), and the installation and adjustment of the expansion joints in accordance with the details shown on the plans and as directed by the Engineer. The furnishing and installation of all necessary hardware and accessories as supplied by the Expansion Joint Manufacturer are to be included in this work, including the anchorage system and any temporary erection material. All work and materials for the installation of the expansion joints are to comply with the written recommendations of the Expansion Joint Manufacturer.

Field Construction Notes:

If the steel extrusion is spliced in the field, the splice location shall be detailed on the shop drawings. The connection details shall include tab plates and prepared ends to accommodate the necessary welding. See details in these plans.

Galvanized coating damage by field welding shall be repaired in accordance with Construction and Materials I.M. 410.

Neoprene Gland Notes:

The neoprene gland is to be placed as one continuous piece from end to end of the steel extrusion.

The neoprene gland shall conform to ASTM-2628 modified to exclude recover test and compression set.

The Contractor shall install the gland above the minimum temperature of 45° and the minimum joint opening and corresponding maximum deck temperature shown in these plans. The deck temperature shall be measured by recording the surface temperatures on the underside of the deck adjacent to the joints. If the deck temperature does not fall within the specified temperature range before the Contractor has completed all other required work, it will be necessary for the Contractor to return to the project site to complete installation and testing of the neoprene gland. If the Contractor is required to return to the project site after all other required work has been completed, the Contractor shall complete installation and testing of neoprene gland at no extra charge to the State.

The number of feet of neoprene gland installed shall be paid for at the contract price per foot based on plan quantities. The price for "Neoprene Gland Installation and Testing" shall be full compensation for installing and testing of the new neoprene gland. This work will consist of cleaning the extrusion, installation of the neoprene gland and water tight testing of the expansion joint system. All work and materials necessary for the installation of the neoprene gland shall comply with the recommendations of the Expansion Joint Manufacturer. The price bid for "Neoprene Gland Installation and Testing" shall include all watertight integrity testing, leak repairs as directed by the Engineer, and subsequent watertight testing until a leak free installation is achieved.

Watertight Integrity Testing And Repair Notes:

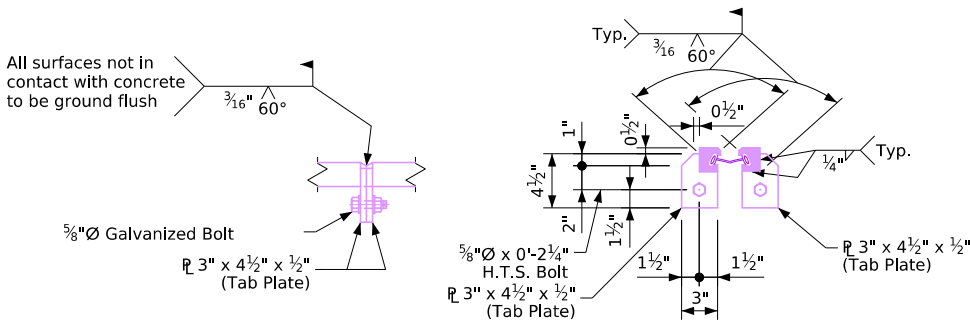
After installation of each neoprene gland, the Contractor shall perform watertight integrity tests at the deck level to detect any leakage. The tests are to check for leakage at the upturned ends of the expansion device and for leakage along the expansion device across the deck and any medians or sidewalks. The Contractor may conduct a single test of the entire device including upturned ends or may conduct separate tests of upturned ends and one or more tests of overlapping lengths between the upturned ends.

At each upturned end of the expansion device, the Contractor shall block out on the deck at least 3 feet of the expansion device leading to the upturned end and flood the area. A minimum water depth of 3" shall be maintained at the gutter line for at least 30 minutes. During the test, the Inspector shall observe for any overflow at the upturned end. At the conclusion of the test the Inspector will examine the underside of the joint for leakage. The expansion device is considered watertight if the Inspector observes no overflow during the test and if no dripping water or water droplets are visible in the under deck areas near the upturned end.

The Contractor shall test the expansion device between upturned ends by blocking out and covering the device with ponded or flowing water to a depth of at least 1" at all points, for at least 30 minutes. Vertical curb surfaces may be tested with an unnozzled hose delivering approximately one gallon per minute directed to flow over the entire curb height for 30 minutes. At the conclusion of the test, the inspector will examine the underside of the joint for leakage. The expansion device is considered watertight if no dripping water or water droplets are visible in the under deck areas along the full length of the expansion joint. Damp concrete that does not show dripping water or water droplets is not considered a sign of leakage.

If the expansion device leaks at an upturned end or along its length, the Contractor shall locate the leak(s) and take repair measures to stop the leakage. The repair measures shall be as recommended by the Manufacturer and approved by the Engineer prior to beginning corrective work.

If measures to eliminate leakage are taken, the Contractor shall perform subsequent watertight integrity tests subject to the same conditions as the original test.



End View Section Thru Extrusion

Field Splice Detail

Design For Repair To 45° Skew (L.A.)

288'-0" x 44'-0" Pretensioned
Prestressed Concrete Beam Bridge

95'-9" End Spans96'-6" Interior Span

Expansion Device Notes

STA. 673+11.00 (IA 44)Turn-in Date: October 2026

Shelby County

IOWA DEPARTMENT OF TRANSPORTATION

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