Standard Drawing Guidance (do not show on plans):

① Choose one of the 4 details for the top flange blockout detail and follow the provided detail guidance. For 0-7° skew remove G6 bars from bill of reinforcing.

② The maximum strand arrangement is shown in details including top straight strands. Remove unnecessary strands from the four details where shown. Give spacing of top straight strands if used. See 751.22.2.2 for top straight strand placement criteria.

③ This detail only needs to be used if the structure is over water. For all other crossings remove this detail.

④ Modify note as necessary. The 10 strands indicated is applicable for NU 35, 43 & 53. Indicate two more strands for NU 63, 70 and 78.

⑤ Subtract or add B2 and D1 bars as required by design.

Use adjacent chart for the actual lengths of the B1 and B2 bars to be reported in the bill of reinforcing.

		NU 35	NU 43	NU 53	NU 63	NU 70	NU 78
B1	No. 4	4′-4″	5′-0″	5′-10″	6′-8″	7′-4″	8′-0″
	No. 5	4′-4″	5′-0″	5′-10″	6′-8″	7′-3″	7′-11″
	No. 6	4′-3″	4′-11″	5′-8″	6′-6″	7′-2″	7′-10″
B2 No. 6		3′-8″	4′-4″	5′-1″	5′-11″	6′-7″	7′-3″

⑥ A1 reinforcement (temporary camber stresses) shall consist of the four 3/8″Ø reinforcement support strands with deformed bars added only as needed. The WWR5 in the top flange shall not be used for A1 reinforcement because mats can not be spliced (insufficient concrete cover results from layered mats.)

⑦ Use for open diaphragms. Omit note about length of coil tie rods at exterior girders.

⑧ Adjust for modified flange thickness.

⑨ Remove underline part for CIP slabs.

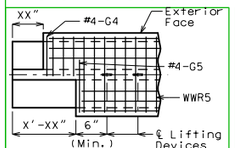
⑩ Substitute following values into drawing.

NU	a	b	c	d
35	20 11/16″	2′-11 7/16″	3′-3 1/8″	2′-9 3/8″
43	2′-4 9/16″	3′-7 5/16″	3′-11 3/4″	3′-5 1/4″
53	3′-2 13/32″	4′-5 5/32″	4′-9 5/8″	4′-3 1/8″
63	4′-0 1/4″	5′-3″	5′-7 1/2″	5′-1″
70	4′-8 1/8″	5′-10 7/8″	6′-3 3/8″	5′-8 7/8″
78	5′-4″	6′-6 3/4″	6′-11 1/4″	6′-4 3/4″

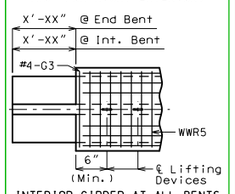
⑪ Remove note for NU 53, 63, 70 and 78.

⑫ Remove notes for NU 35 and 43.

⑬ Remove if #5-B1 bars are used.



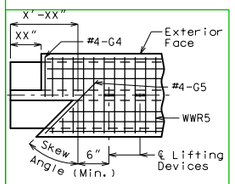
LEFT EXTERIOR GIRDER AT INTERMEDIATE BENT (ROTATE 180° FOR RIGHT EXTERIOR)



INTERIOR GIRDER AT ALL BENTS & EXTERIOR GIRDER AT END BENT

TOP FLANGE BLOCKOUT

NO SKEW

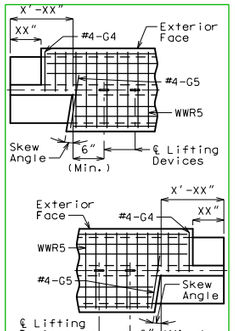


INTERIOR GIRDER AT ALL BENTS & EXTERIOR GIRDER AT END BENT

TOP FLANGE BLOCKOUT

(Mirror for right advanced)

>0° TO 7° LA SKEW



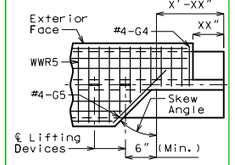
LEFT EXTERIOR GIRDER AT INTERMEDIATE BENT (ROTATE 180° FOR RIGHT EXTERIOR)

INTERIOR GIRDER AT ALL BENTS & EXTERIOR GIRDER AT END BENT

TOP FLANGE BLOCKOUT

(Mirror for right advanced)

>7° TO 14° LA SKEW



LEFT EXTERIOR GIRDER AT INTERMEDIATE BENT (ROTATE 180° FOR RIGHT EXTERIOR)

INTERIOR GIRDER AT ALL BENTS & EXTERIOR GIRDER AT END BENT

TOP FLANGE BLOCKOUT

(Mirror for right advanced)

>14° TO 60° LA SKEW

The left advanced details shown may be used for right advanced bridges. May remove mirror note if left advanced.

Blockout shall be dimensioned along the girder to 1 1/2 inches inside the face of the diaphragm and adjusted for girder tilt if present.

Revise bent references as required. Specify the bent number if blockout varies by bent.

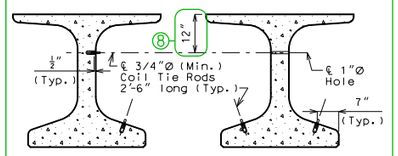
The skew angle value need not be shown for tangent bridges. Consult SPM or Liaison on replacing "skew angle" with actual value for curved bridges.

Revised titles for non-integral end bents (exterior girder at end bent will be same detail as at intermediate bent).

FLANGE BLOCKOUT DATA			
Skew	X Eq. Spa.	X #4-G6	Bar Lengths
>14° to 21°	3	2	G3 bar = 46.25″ / cos(skew)
>21° to 27°	4	3	
>27° to 32°	5	4	G5 bar = 32.125″ / cos(skew)
>32° to 37°	6	5	
>37° to 42°	7	6	For skews > 7° to 14°:
>42° to 46°	8	7	G6 bar = (G3 bar + 46.25″) / 2
>46° to 49°	9	8	
>49° to 52°	10	9	For skews > 14° to 60°:
>52° to 55°	11	10	
>55° to 57°	12	11	Report length of G6 bars as "Varies".
>57° to 60°	13	12	

⑦

Coil Ties for Open Diaphragms



DETAILS OF COIL TIES

Cast 1″Ø hole horizontally in girder for #6 bar 5′-6″ long and clear reinforcing steel or strands by 1 1/2″ minimum.

NU_Bars.dgn Effective: Apr. 2021 Supersedes: Oct. 2018

Concrete for prestressed girders shall be Class A-1 with f′c = 8000 psi and f′ci = 6500 psi.

(+) indicates prestressing strand.

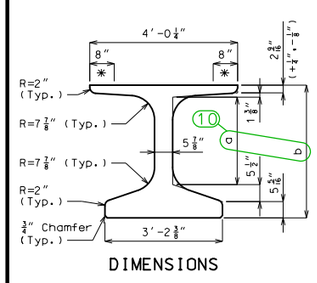
Use strands with an initial prestress force of kips.

Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6 inch diameter in accordance with AASHTO M 203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.

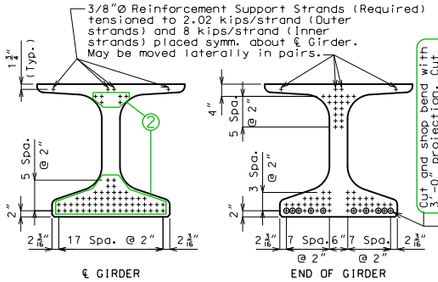
Fabricator shall be responsible for location and design of lifting devices.

⑨ ✱ Girder top flange shall be steel troweled to a smooth finish for 8″ at the edges, as shown. Apply two layers of 30-lb roofing felt as a bond breaker to this region only excluding where joint filler is applied. The center portion shall be rough finished by scarifying the surface transversely with a wire brush, and no laitance shall remain on the surface.

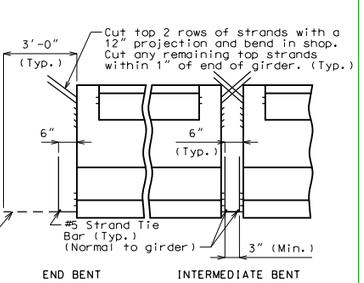
✱✱ At the contractor's option the location for bent-up strands may be varied from that shown for fully bonded strands only. The total number of bent-up strands shall not be changed. One strand tie bar is required for each layer of bent-up strands except at end bents which require one bar on the bottom layer of strands only. No additional payment will be made if additional strand tie bars are required.



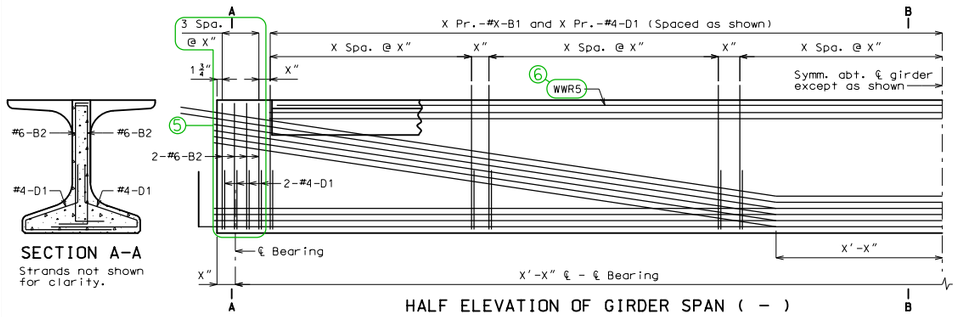
DIMENSIONS



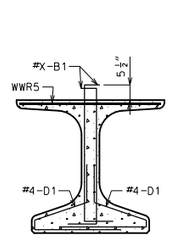
STRAND ARRANGEMENTS



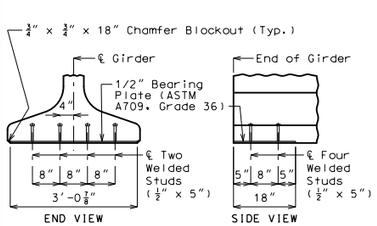
STRAND DETAILS AT GIRDER ENDS



HALF ELEVATION OF GIRDER SPAN (–)



Exterior and interior girders are the same, except for coil ties, and top flange blockout and coil inserts for slab drains. Reinforcement support strands not shown for clarity.

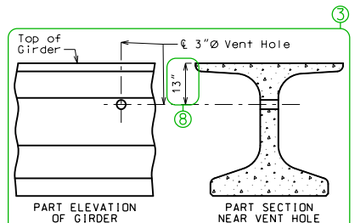


BEARING PLATE DETAILS

Galvanize the 1/2″ bearing plate (ASTM A709 Grade 36) in accordance with ASTM A123.

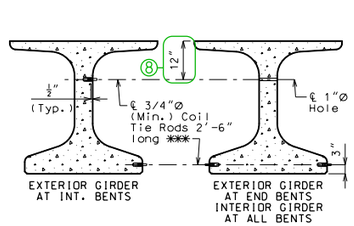
Cost of furnishing, galvanizing, and installing the 1/2″ bearing plate (ASTM A709 Grade 36) and welded studs in the prestressed girder will be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

③



DETAILS OF VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2″ minimum and steel interm. diaphragm bolt connections by 6″ minimum.

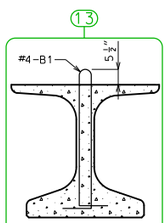


DETAILS OF COIL TIES

Cast 1″Ø hole horizontally in girder for #6 bar 5′-6″ long and clear reinforcing steel or strands by 1 1/2″ minimum.

✱✱✱ Length of coil tie rods at exterior face of exterior girders at end bents = ′-″.

⑬



B1 BAR PERMISSIBLE ALTERNATE SHAPE

ALTERNATE BAR REINFORCING STEEL DETAILS

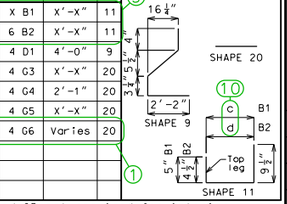
Note: This drawing is not to scale. Follow dimensions.

Detailed
Checked

Sheet No. of

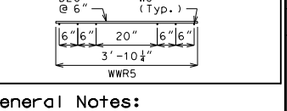
BILL OF REINFORCING STEEL - EACH GIRDER				
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE	
XXX	X B1	X′-X″	11	
XXX	6 B2	X′-X″	11	
XXX	4 D1	4′-0″	9	
2	4 G3	X′-X″	20	
2	4 G4	2′-1″	20	
2	4 G5	X′-X″	20	
XXX	4 G6	Varies	20	

⑤ BENDING DIAGRAMS



G4 and G5 not required for interior girders. G3 and G6 not required for exterior girders of intermediate spans. Half no. of G3, G4, G5 and G6 not required for ext. girders of end spans.

WELDED WIRE REINFORCEMENT - EACH GIRDER



General Notes:

Reinforcing Steel:

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

All bar reinforcement shall be Grade 60.

Welded Wire Reinforcement (WWR) shall be in accordance with AASHTO M 336.

The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 bars shall be epoxy coated.

Miscellaneous:

Cost of 3/4″Ø coil tie rods placed in diaphragms will be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

Coil ties shall be held in place in the forms by slotted wire-setting-studs projecting thru forms. Studs are to be left in place or replaced with temporary plugs until girders are erected, then replaced by coil tie rods.

⑪ The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders. The cost for furnishing, installing, and removing bracing will be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

For location of coil inserts at slab drains, see Sheet No. .

For location of coil ties and #6 bars at concrete bent diaphragms, see Sheets No. and .

⑫ The 1 1/2″Ø holes shall be cast in the web for steel intermediate diaphragms. Drilling is not allowed. For location of holes and details of steel intermediate diaphragms, see Sheet No. --.

For Girder Camber Diagram, see Sheet No. .

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED	
4/12/2021	
ROUTE ✱	STATE MO
DISTRICT BR	SHEET NO. ✱
COUNTY ✱	
JOB NO. ✱	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. NU BARS	

DESCRIPTION	DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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JEFFERSON CITY, MO 65102
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NU_Bars.dgn 11:16:27 AM 4/12/2021