

BEAM END DETAIL

SECTION A-A

Concrete Area to be removed.  
Cut beam reinforcing flush with removal lines.

Note: Strip Top Flange as shown at Abutment and Pier Diaphragms.

BILL OF MATERIAL		
Item	Unit	Quantity
Prestressed concrete beams (NU35+1) Span #1	Lin.Ft.	455.6
Prestressed concrete beams (NU35+1) Spans #2 & #3	Lin.Ft.	968.3
Prestressed concrete beams (NU35+1) Span #4	Lin.Ft.	519.2
Prestressed concrete beams (NU35+1) Span #5	Lin.Ft.	525.6
The following quantities are given for information only and shall not be paid for directly but shall be made subsidiary to the bid item "Prestressed Concrete Beams (NU35+1)"		
Beam concrete, Span #1 (f'c= 6,000 PSI) (per beam)	Cu.Yds.	11.7
Beam concrete, Spans #2 & #3 (f'c= 6,000 PSI) (per beam)	Cu.Yds.	12.4
Beam concrete, Span #4 (f'c= 6,000 PSI) (per beam)	Cu.Yds.	13.3
Beam concrete, Span #5 (f'c= 6,000 PSI) (per beam)	Cu.Yds.	13.5
Approx. Wt. per 65'-1" beam	Tons	23.6
Approx. Wt. per 69'-2" beam	Tons	25.1
Approx. Wt. per 74'-2" beam	Tons	26.9
Approx. Wt. per 75'-1" beam	Tons	27.3
1/2" Ø Prestressing strand (270 KSI low relaxation fy= 243 KSI)	Lin.Ft.	98,237
Epoxy reinforcing steel (fy=60,000 PSI)	Lbs.	42,193
Reinforcing steel (fy=60,000 PSI)	Lbs.	40,836
Elastomeric Brg. pads (3/4" x 10" x 3'-0")	Each	70
3/4" Ø Open Coil Inserts	Each	40
3/4" Ø Threaded Coil Rods	Each	40
1" Ø Formed Hole	Each	100
Lifting devices	Each	70
Bearing plates (6" x 1'-3" x 3'-0 3/8")	Each	70

GENERAL NOTES

Fabricate the precast prestressed beams in accordance with the KDOT Specifications. Submit shop drawings in accordance with the KDOT Specifications except nine sets are required.  
Use air entrained concrete. The KDOT Materials Section shall approve the mix design. Unless otherwise shown on the plans, f'c = 6,000 psi and f'c at release = 5,000 psi.

Use reinforcing steel conforming to the requirements of ASTM A615, Grade 60. The reinforcing steel shown shall be uncoated unless otherwise indicated.  
Use 1/2" nominal diameter, uncoated, seven-wire, low relaxation prestressing tendons conforming to the requirements of ASTM A416, Grade 270.  
Use bolts having an ultimate strength 50% in excess of the manufacturer's safe load. All items (except the tendons) cast-in or inserted in prestressed beams shall be epoxy coated or galvanized. Show Formed Holes on shop drawings. All bolts, nuts and washers shall be subsidiary to the bid item, "Prestressed Concrete Beams (NU 35+1)".

Show on the shop drawings any hardware, holes or other appurtenances that are required to be incorporated into the girder to construct the girder or for any temporary works needed to construct the bridge (e.g. safety railing pockets).  
After beams are in the final position, remove lifting devices.

See "Lifting Device" detail below. Removal of the lifting devices, coating and grouting shall be subsidiary to the bid item: "Prestressed Concrete Beams (NU 35+1)".  
Use elastomeric bearing pads conforming to the KDOT Specifications. Bearing pads and Type B expansion joint material shall be subsidiary to the bid item, "Prestressed Concrete Beams (NU 35+1)".

The beam lengths shown on the design plans are net lengths measured horizontally along the beam centerline. The beam manufacturer shall make necessary allowances for grade, and for shortening due to elastic shortening, creep and shrinkage.

The beams shall reasonably conform to the lines and dimensions shown on the design plans and be within the tolerances specified in the latest publication of Prestressed Concrete Institute's, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products", except as modified by this sheet or the KDOT Specifications.

Bevel all exposed edges of beams except the tops and ends with a 3/4" triangular molding or round the edges to a 3/4" radius. Round the angle of intersection between the web and the flanges.

Apply an initial force of 1,000 to 3,000 pounds to each strand to take up any slack in the cables. Unless otherwise noted on the plans, apply a force of 31,000 pounds to each strand. Stress harped strands to a magnitude such that they are tensioned to 31,000 pounds after they are in position.

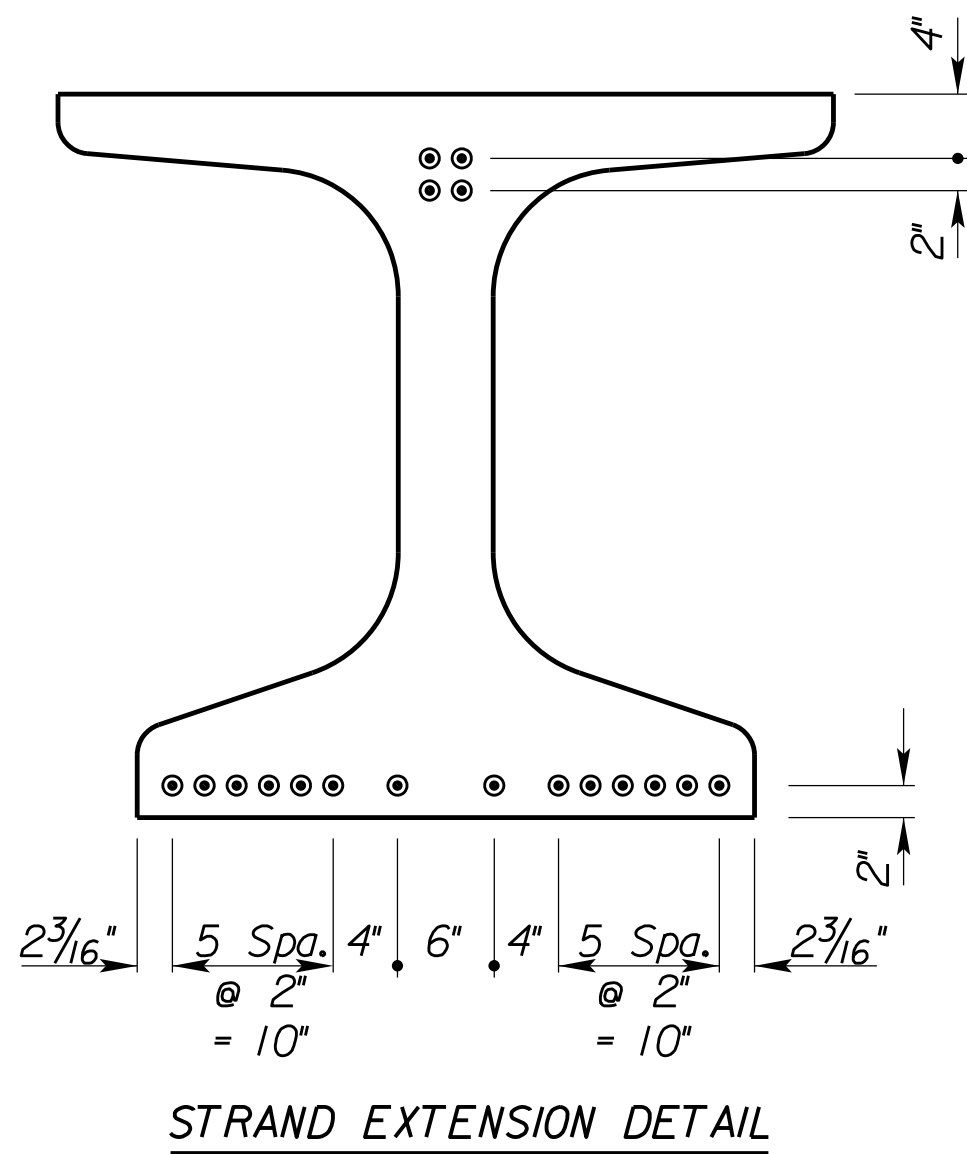
The center portion of the girder top flange shall be rough finished by scarifying the surface transversely with a wire brush or stiff broom and no laitance shall remain on the surface. The outside 9" on each side of the top flange shall be steel troweled to a smooth finish and a bond breaker shall be applied to this region only. Bond breaker shall be 30\* roofing felt. Secure roofing felt to the top flange with an adhesive approved by the engineer.

Fill trapped air holes and surface voids on the exterior face of the exterior beams with an approved concrete masonry coating. This work shall conform to KDOT Specifications. This work shall be subsidiary to the bid item, "Prestressed Concrete Beams (NU 35+1)".

Detension strands in a sequence which minimizes lateral eccentricity. Show the method and sequence of strand release on the shop drawings. Use extreme care when lifting, handling, storing and transporting beams. Use the lifting system shown or an alternate system approved by the Engineer. Keep the beam in an upright position at all times. Support the beam on bearing points positioned directly below the designated lifting points or designated bearing points.

Do not place the bridge slab before the beams are 28 days old. Pour diaphragms as detailed in the bridge plans.

Stencil with paint the following information on the webs approximately 5'-0" from one end of the beam: date of concrete placement, date of strand release, and beam mark.



STRAND EXTENSION DETAIL

LEGEND

- ☆ Use 3/4" R when field welding will occur, otherwise use 1/2" R.
- Epoxy coated bars.

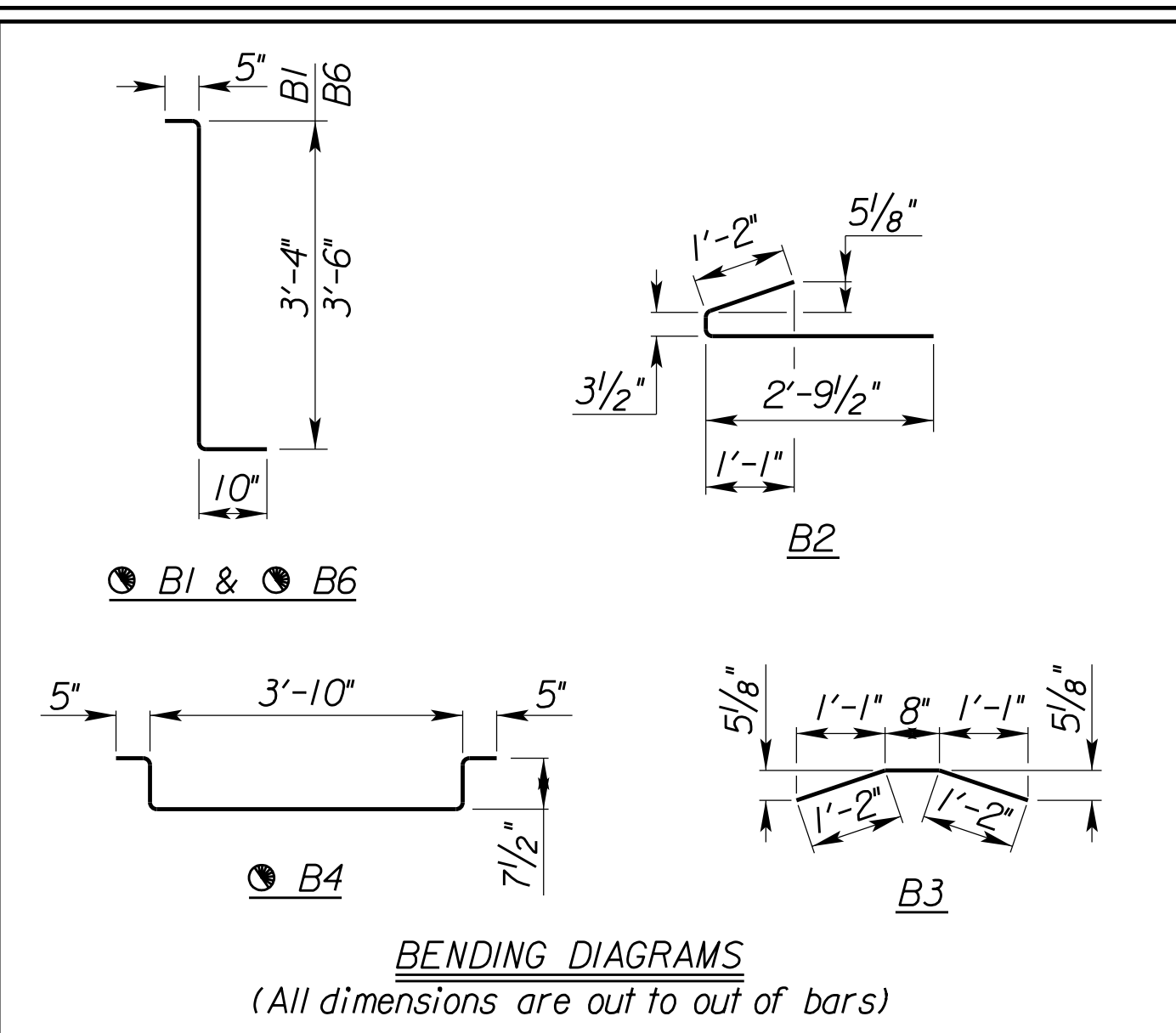
HOLD DOWN FORCE @ HARP POINTS (UPLIFT) (KIPS)			
SPAN	PER STRAND	NO. OF STRANDS	TOTAL
#1	2.41	8	19.28
#2	2.27	8	18.16
#3	2.27	8	18.16
#4	1.77	12	21.24
#5	1.75	12	21.00

NOTE: During transportation and construction only, support beams on bearing points a maximum of 7'-6" from the beam end. The Fabricator shall show the proposed support locations on the shop drawings.

NOTE: Extend 18 strands 2'-4" beyond the end of the beam. Strands not shown shall be cut flush with the end of the beam. See "Strand Extension Detail".

BILL OF REINFORCING STEEL					
65'-1" Beam (1 Listed-7 Reqd.) (Span #1)					
Straight bars			Bent bars		
Mark	No.	Size Length	Mark	No.	Size Length
B5	20	#4 33'-4"	● B1	82	#5 4'-7"
			● B6	92	#5 4'-9"
			B2	174	#4 4'-3"
			B3	87	#3 3'-0"
			● B4	87	#3 5'-11"
69'-2" Beam (1 Listed-14 Reqd.) (Spans #2 & #3)					
Straight bars			Bent bars		
Mark	No.	Size Length	Mark	No.	Size Length
B7	20	#4 35'-5"	● B1	86	#5 4'-7"
			● B6	104	#5 4'-9"
			B2	190	#4 4'-3"
			B3	95	#3 3'-0"
			● B4	95	#3 5'-11"

BILL OF REINFORCING STEEL					
74'-2" Beam (1 Listed-7 Reqd.) (Span #4)					
Straight bars			Bent bars		
Mark	No.	Size Length	Mark	No.	Size Length
B5	20	#4 37'-11"	● B1	90	#5 4'-7"
			● B6	140	#5 4'-9"
			B2	230	#4 4'-3"
			B3	115	#3 3'-0"
			● B4	115	#3 5'-11"
75'-1" Beam (1 Listed-7 Reqd.) (Span #5)					
Straight bars			Bent bars		
Mark	No.	Size Length	Mark	No.	Size Length
B7	20	#4 38'-4"	● B1	90	#5 4'-7"
			● B6	132	#5 4'-9"
			B2	222	#4 4'-3"
			B3	111	#3 3'-0"
			● B4	111	#3 5'-11"



BENDING DIAGRAMS  
(All dimensions are out to out of bars)

† If Welded Wire Fabric (WWF) is used in-lieu of reinforcing steel bars shown on the "Beam Details" Sht's. #59 - 60, the spacing of wires for the WWF shall be equal or less than the vertical bars shown in the typical beam sections. The equivalent A<sub>s</sub> for the WWF shall be equal to or greater than the typical beam sections.

Welded Wire Fabric Equivalent Steel A <sub>s</sub> †						
Size	3"	6"	9"	12"	15"	18"
#3	0.440	0.220	0.147	0.110	0.088	0.073
#4	0.800	0.400	0.267	0.200	0.160	0.133
#5	1.234	0.617	0.411	0.308	0.247	0.206
#6	1.761	0.880	0.587	0.440	0.352	0.293

NO.	DATE	DESCRIPTION

PROJ NO:	35838B
SCALE:	AS NOTED
DATE:	
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
YEAR:	2019
SHEET NO	61
SHEET	61 OF 135

Plotted By: --  
Plot Location: \$UNIT\$\nFile: T:\35838A-COW\_HarryStBridge\Cadd\Sheets\Structures\838BDT5.dgn  
PLOT: 10/3/2019 10:35:38 AM