Washington State Department of Transportation

Publications Transmittal

Transmittal Number	Date
PT 07-009	February 26, 2007
Publication Distribution: To: All *Bridge Design Manual* holders	
Publication Title: *Bridge Design Manual* Revision M 23-50.01	Publication Number: M 23-50
Originating Organization: Washington State Department of Transportation, and Bridge Design Office through Engineering Publications	

Remarks and Instructions

Remarks:

Instructions:

Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the *Bridge Design Manual* that are to be removed and inserted to accomplish this revision.

Chapter	Remove		Insert	
	Pages	Sheets	Pages	Sheets
Contents	I-XVIII	9	I-XVIII	9
Chapter 5 Contents	5-I – 5-VII	4	5-I – 5-VII	4
Chapter 05 Concrete Structures 5.6 Precast Prestressed Girder Superstructures	5-111 – 5-112	1	5.6-21 – 5.6-22	1
Chapter 5 Appendix 5.3-A7 Slab Overhang Design-Interior Barrier Segment	5.3-A7-1	1	5.3-A7-1	1
Chapter 5 Appendix 5.3-A8 Slab Overhang Design-End Barrier Segment	5.3-A8-1	1	5.3-A8-1	1
Chapter 5 Appendix 5-A	5.6-A3-1 – 5.6-A12-10	41	5.6-A3-1 – 5.6-A12-8	37
	5.6-A19-1 – 5.6-A19-2	1	5.6-A19-1 – 5.6-A19-2	1
	5.6-A20-1 – 5.6-A20-2	1	5.6-A20-1 – 5.6-A20-2	1
	5.6-A21-1 – 5.6-A21-4	2	5.6-A21-1 – 5.6-A21-4	2

Chapter	Remove		Insert	
	Pages	Sheets	Pages	Sheets
Chapter 10 Contents	I-III	2	I-III	2
Chapter 10 Appendix 10-A	10.2-A6-1 – 10.2-A6-3	2	10.2-A6-1 – 10.2-A6-3	2
Chapter 13 Contents	I – II	1	13-I – 13-II	1
Chapter 13 Bridge Load Rating 13.1 General	13-1 – 13-4 13.1-5 – 13.1-10	5	13.1-1 – 13.1-10	5
Chapter 13 Bridge Load Rating 13.2 Special Rating Criteria	13.2-1 – 13.2-4	2	13.2-1 – 13.2-3	2
Chapter 13 Bridge Load Rating 13.3 Load Rating Software	N/A	N/A	13.3-1	1

Additional copies may be purchased from:
Washington State Department of Transportation
Finance and Administration
Directional Documents and Engineering Publications
PO BOX 47408
Olympia, WA 98504-7408

Phone: (360) 705-7430
Fax: (360) 705-6861
E-mail: engrpubs@wsdot.wa.gov

Please e-mail us if you no longer desire to receive updates, have a quantity change, or your address has changed.

Distributed By	Phone Number	Signature
Directional Documents and Engineering Publications	(360) 705-7430 FAX: 705-6861	Joe Fabun

Bridge Design Manual LRFD

M 23-50.01

February 26, 2007

Washington State Department of Transportation
Program Development Division
Bridge and Structures

Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats: large print, Braille, cassette tape, or on computer disk for people with disabilities by calling the Office of Equal Opportunity (OEO) at 360-705-7097. Persons who are deaf or hard of hearing may contact OEO through the Washington Relay Service at 7-1-1.

Title VI Notice to Public

It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For Title VI complaint forms and advice, please contact OEO's Title VI Coordinator at 360-705-7098 or 509-324-6018.

To get the latest information on WSDOT administrative and engineering manuals, sign up for e-mail updates for individual manuals at: www.wsdot.wa.gov/publications/manuals

Washington State Department of Transportation
Administrative and Engineering Publications
PO Box 47304
Olympia, WA 98504-7304

Phone: 360-705-7430
E-mail: engrpubs@wsdot.wa.gov
Internet: www.wsdot.wa.gov/publications/manuals

Contents

Chapter 1 General Information

Chapter 2 Preliminary Design

Chapter 5 Concrete Structures

Chapter 6 Structural Steel

Chapter 7 Substructure Design

Chapter 8 Walls & Buried Structures

Chapter 9 Bearings & Expansion Joints

Chapter 10 Signs, Barriers, Approach Slabs & Utilities

Chapter 11 Detailing Practice

Chapter 12 Quantities, Costs & Specifications

Chapter 13 Bridge Load Rating

Chapter 5 Concrete Structures

Type	Depth in	Unit Weight k/ft	Max. Span ft	Relative Cost Factor	Fabrication Cost Range		Final In-Place Cost**
W42G	42.00	0.424	85	0.75	$85	$90	$99
W50G	50.00	0.585	110	0.83	$95	$100	$110
W58G	58.00	0.672	125	0.92	$105	$110	$121
W74G	73.50	0.831	150	1.00*	$115	$120	$132
WF42G	42.00	0.806	115	1.35	$150	$155	$178
WF50G	50.00	0.859	130	1.44	$160	$165	$190
WF58G	58.00	0.913	145	1.52	$170	$175	$201
WF74G	74.00	1.020	165	1.61	$180	$185	$213
W83G	82.61	1.087	175	1.70	$190	$195	$224
W95G	94.49	1.167	160	2.00	$200	$230	$265
WBT32G	32.00	0.598	75	1.57	$150	$180	$207
WBT38G	38.00	0.638	90	1.61	$155	$185	$213
WBT62G	62.00	0.798	130	1.74	$170	$200	$230
U54G4	54.00	1.154	130	3.40	$290	$390	$449
U54G5	54.00	1.234	130	3.44	$295	$395	$454
U54G6	54.00	1.394	120	3.48	$300	$400	$460
U66G4	66.00	1.343	155	3.44	$295	$395	$454
U66G5	66.00	1.423	150	3.48	$300	$400	$460
U66G6	66.00	1.583	145	3.53	$305	$405	$466
U78G4	78.00	1.531	170	3.70	$325	$425	$489
U78G5	78.00	1.611	170	3.79	$335	$435	$500
U78G6	78.00	1.771	165	3.88	$345	$445	$512
UF60G4	60.00	1.342	150	3.48	$300	$400	$460
UF60G5	60.00	1.422	150	3.53	$305	$405	$466
UF60G6	60.00	1.582	135	3.57	$310	$410	$472
UF72G4	72.00	1.530	165	3.62	$315	$415	$477
UF72G5	72.00	1.610	170	3.66	$320	$420	$483
UF72G6	72.00	1.770	160	3.70	$325	$425	$489
UF84G4	84.00	1.719	190	3.96	$355	$455	$523
UF84G5	84.00	1.799	185	4.05	$365	$465	$535
UF84G6	84.00	1.959	170	4.14	$375	$475	$546
WF74PTG	74.00	1.020	175	1.31	$120	$150	$173
W83PTG	82.61	1.087	205	1.35	$130	$155	$178
W95PTG	94.49	1.167	235	1.31	$145	$150	$173

* W74G is used as basis for relative cost analysis

** The final In-Place Cost is based on 1.15 x Fabrication Cost. Producers should be consulted for shipping circumstances

Precast Prestressed Girder Cost Estimate (Per Linear Foot)

Table 5.6.4-1

3. Girder Spacing

Consideration must be given to the slab cantilever length to determine the most economical girder spacing. This matter is discussed in Section 5.6.4.B. The slab cantilever length should be made a maximum if a line of girders can be saved. The spacing of the interior girders must be considered at the same time. Once the positions of the exterior girders have been set, the positions and lengths of interior girders can be established. The following guidance is suggested.

a. Straight Spans

On straight constant width roadways, all girders should be parallel to bridge centerline and girder spacing should be equal.

b. Tapered Spans

On tapered roadways, the minimum number of girder lines should be determined as if all girder spaces were to be equally flared. As many girders as possible, within the limitations of girder capacity should be placed. Slab thickness may have to be increased in some locations in order to accomplish this.

c. Curved Spans

On curved roadways, normally all girders will be parallel to each other. It is critical that the exterior girders are positioned properly in this case, as described in Subsection 5.6.4.B.

d. Geometrically Complex Spans

Spans which are combinations of taper and curves will require especially careful consideration in order to develop the most effective and economical girder arrangement. Where possible, girder lengths and numbers of straight and harped strands should be made the same for as many girders as possible in each span.

e. Number of Girders in a Span

Usually all spans will have the same number of girders. Where aesthetics of the underside of the bridge is not a factor and where a girder can be saved in a short side span, consideration should be given to using unequal numbers of girders. It should be noted that this will complicate crossbeam design by introducing torsion effects and that additional reinforcement will be required in the crossbeam.

B. Slab Cantilevers

The selection of the location of the exterior girders with respect to the curb line of a bridge is a critical factor in the development of the framing plan. This location is established by setting the curb distance, which is that dimension from centerline of the exterior girder to the adjacent curb line. For straight bridges, the distance between the edge of girder and the curb will normally be no less than 2′–6″ for W42G, W50G, and W58G; 3′–0″ for W74G; and 3′–6″ for WF74G, W83G, and W95G. Some considerations which affect this are noted below.

1. Appearance

In the past, some prestressed girder bridges have been designed by placing the exterior girders directly under the curb (traffic barrier). This gives a very poor bridge appearance and is uneconomical. Normally, for best appearance, the largest slab overhang which is practical should be used.

5.7 Roadway Slab

The following information is intended to provide guidance for slab thickness and transverse and longitudinal reinforcement of roadway slab. Information on deck deterioration prevention systems is section 5.7.4.

5.7.1 Roadway Slab Requirements

A. Slab Thickness

Slab thickness for prestressed girder bridges shall be taken as shown in Table 5.7.2-2.

The minimum slab thickness is established in order to ensure that overloads on the bridge will not result in premature slab cracking.

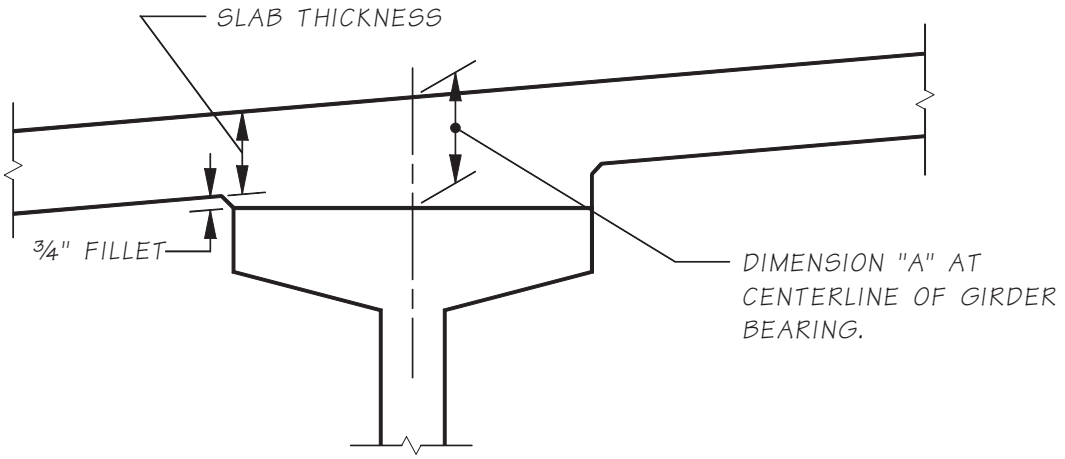
B. Computation of Slab Strength

The thickness for usual slabs are shown in Figure 5.7.1-1 and Figure 5.7.1-2. The slab design span and thickness are defined in Table 5.7.2-2

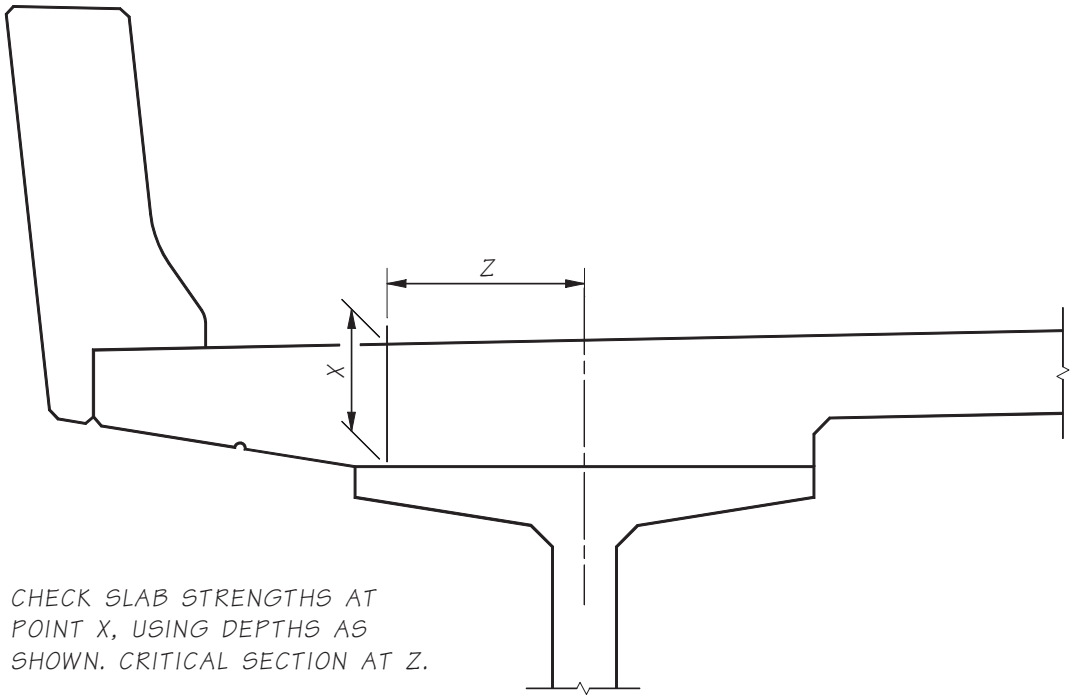
The thickness of the slab and reinforcement in the area of the cantilever may be governed by traffic barrier loading. Wheel loads plus dead load shall be resisted by the sections shown in Figure 5.7.1-2.

Cantilever loads may govern the slab thickness just inside the exterior girder as shown by “Z” in Figure 5.7.1-2.

Design of the cantilever is normally based on the expected depth of slab at centerline of girder span. This is less than the dimensions at the girder ends (somtimes).



Depths for Slab Design at Centerline of Girder Span
Figure 5.7.1-1



$$Z = \frac{b_f - b_w}{2}$$

b_f = WIDTH OF TOP FLANGE

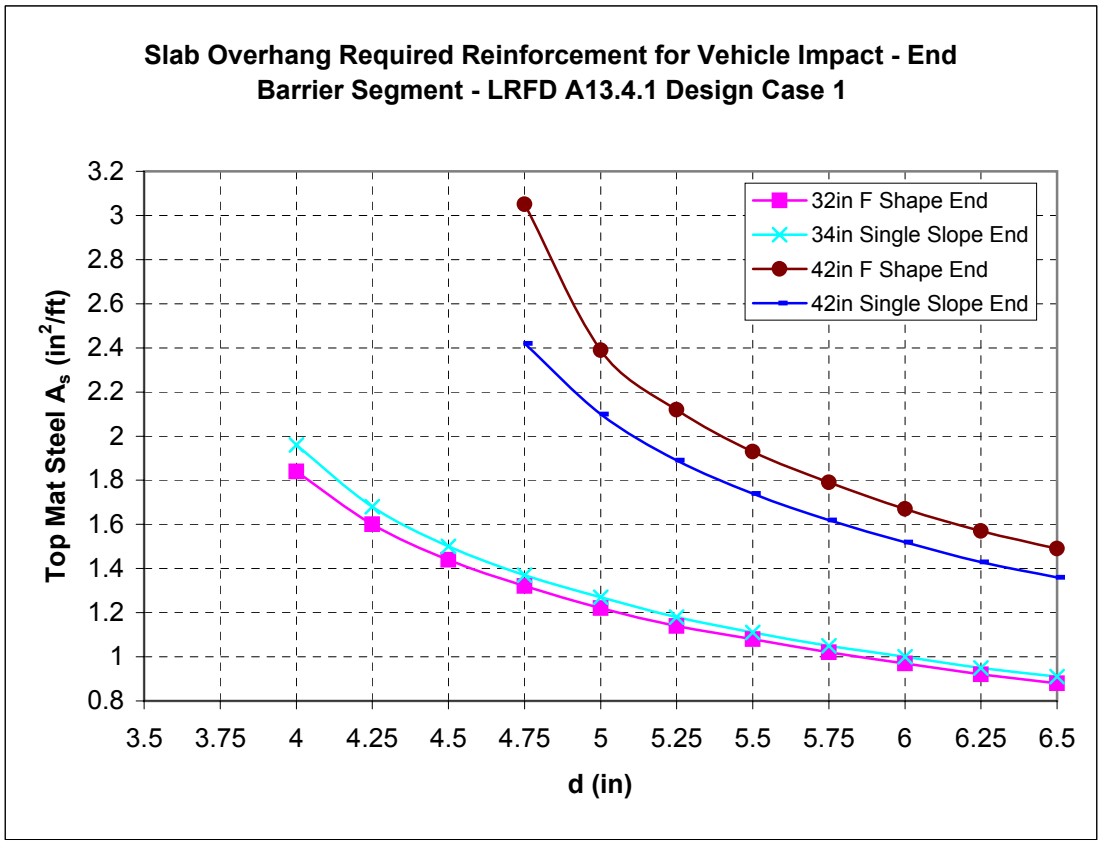
b_w = WEB THICKNESS

Depths for Slab Design at Deck Overhang
Figure 5.7.1-2

C. Computation of "A" Dimension

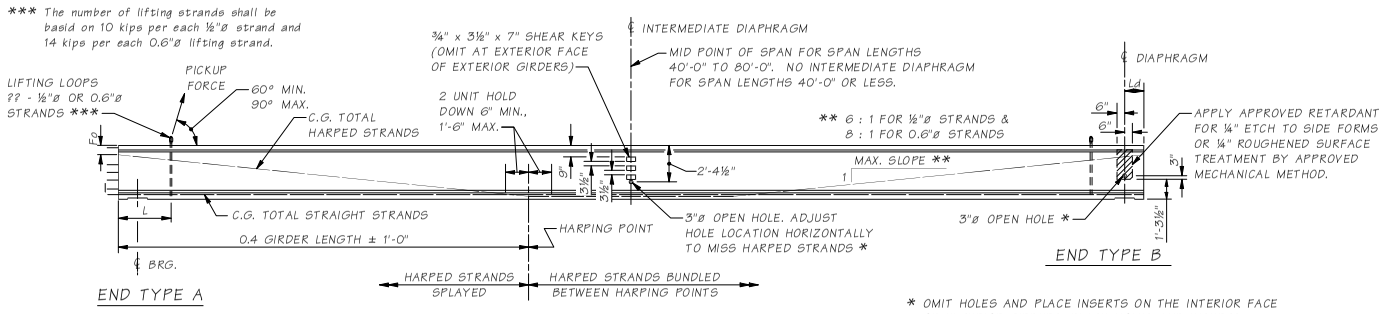
The distance from the top of the slab to the top of the girder at centerline bearing is represented by the "A" Dimension. It is calculated in accordance with the guidance of Appendix B. This ensures that adequate allowance will be made for excess camber, transverse deck slopes, vertical and horizontal curvatures. Ideally the section at centerline of span will have the final geometry shown in Figure 5.7.1-1. Where temporary prestress strands at top of girder are used to control the girder stresses due to shipping and handling, the "A" dimension must be adjusted accordingly.

The note in left margin of the Layout Sheet should read: "A" Dimen. = X" (not for design).



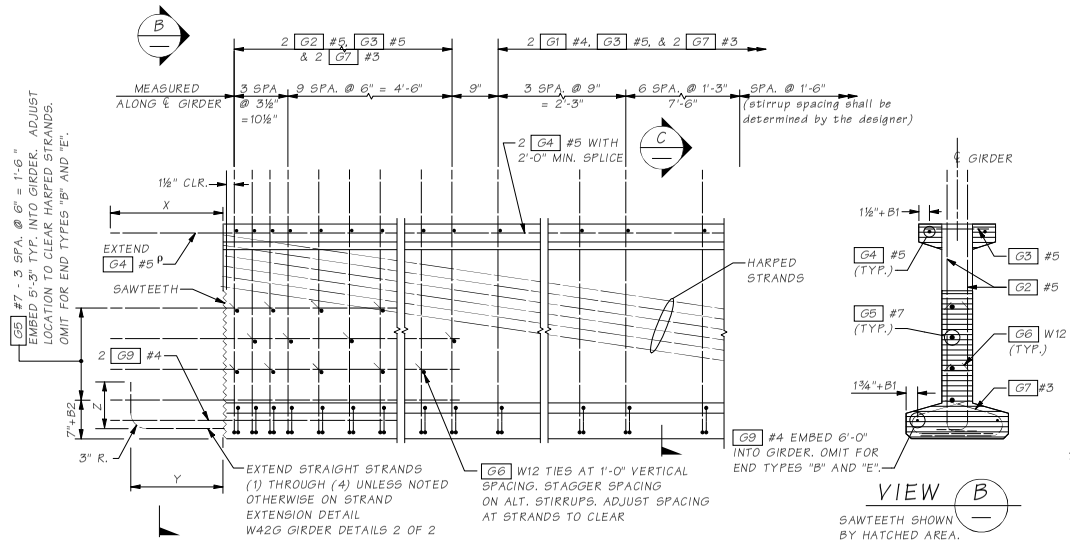
Notes:

1. Top and bottom mats each carry one-half the tension impact load.
2. Only Design Case 1 of LRFD A13.4.1 is considered. Designer must also check Design Cases 2 and 3.
3. Section considered is a vertical section through the slab overhang at the toe of the barrier.



GIRDER ELEVATION

* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)



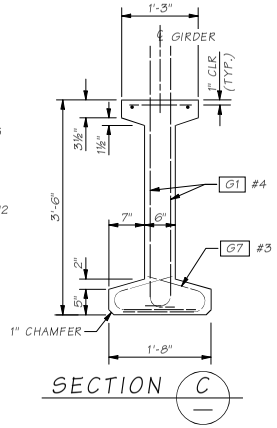
TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.

VIEW B

SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WUAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER .
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE W42G GIRDER DETAILS 2 OF 2.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

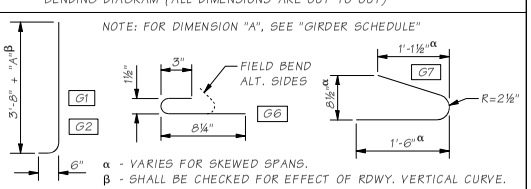
Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	4	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	4	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G1.man							
Supervisor				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By				10	WASH.			
Checked By				JOB NUMBER				
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

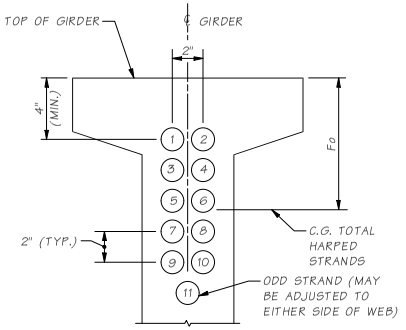
W42G GIRDER DETAILS 1 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

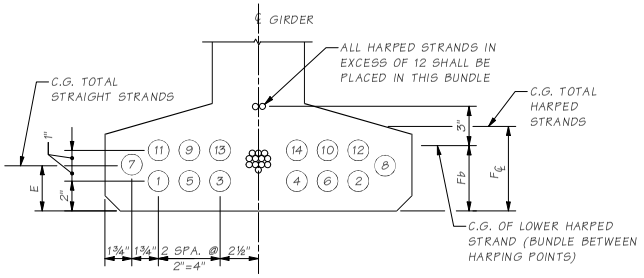
SR JOB NO. SHEET 5.6-A3-1

Fri Jan 26 13:06:07 2007



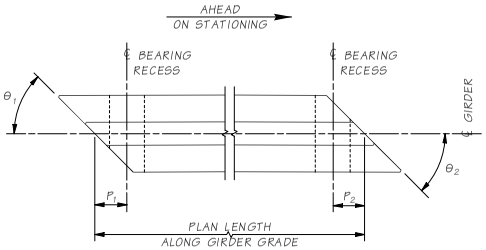
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

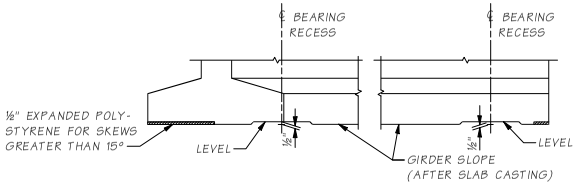
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



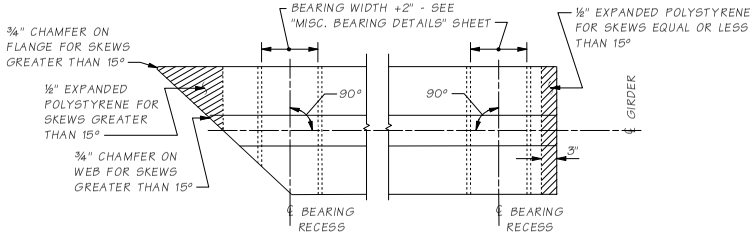
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

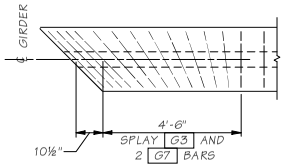
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'CI (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	LOCATION OF C.G. STRANDS (IN.) F℄	LOCATION OF C.G. STRANDS (IN.) Fb	LOCATION OF C.G. STRANDS (IN.) Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

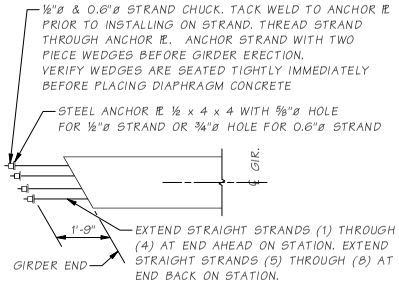


PLAN BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION

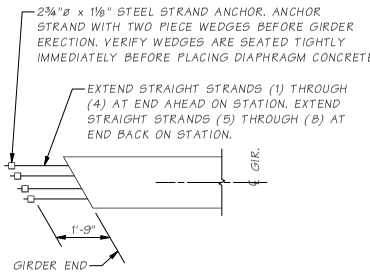


TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



ALTERNATE #1

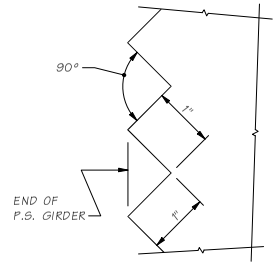


ALTERNATE #2

STRAND EXTENSION DETAIL

n = ? TOTAL NUMBER OF EXTENDED STRANDS

SAWTOOTH DETAILS



SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - W42G GIRDER DETAILS 1 OF 2.

SHEET
JOB NO. 5.6-A3-2
SR

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

Fri Jan 26 13:06:23 2007

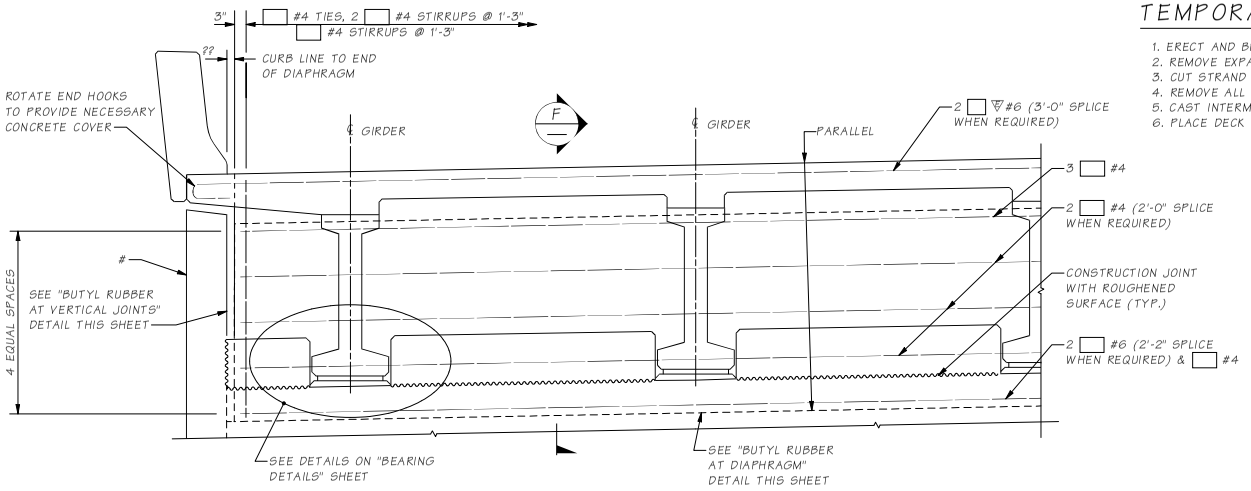
BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W42G GIRDER DETAILS 2 OF 2

BRIDGE SHEET NO. | SHEET | OF | SHEETS

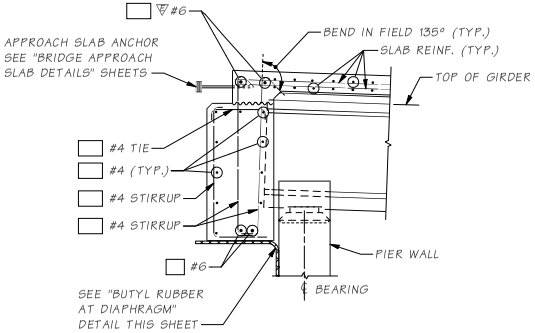


ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM

TEMPORARY STRAND CUTTING SEQUENCE

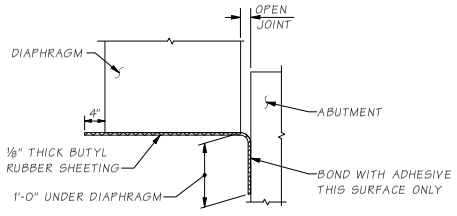
1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



SECTION F

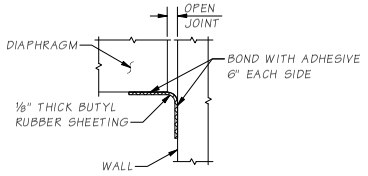
NOTE TO DESIGNER

If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.



ELEVATION BUTYL RUBBER AT DIAPHRAGM

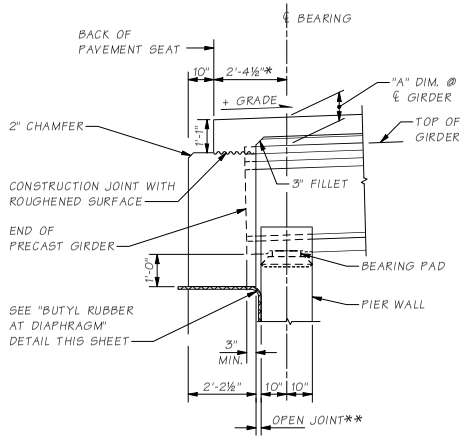
NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.

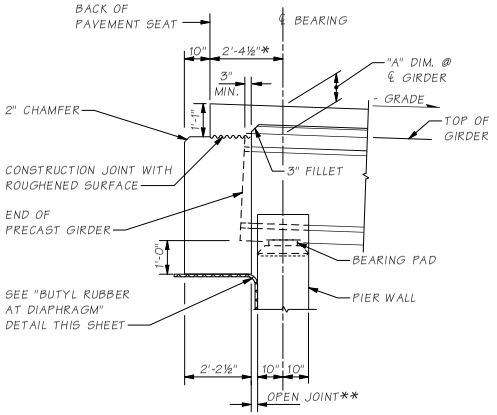


PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint





END DIAPHRAGM GEOMETRY

SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_END_DIA_ON_GIR.MAN							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W42G END DIAPHRAGM ON GIRDER DETAILS

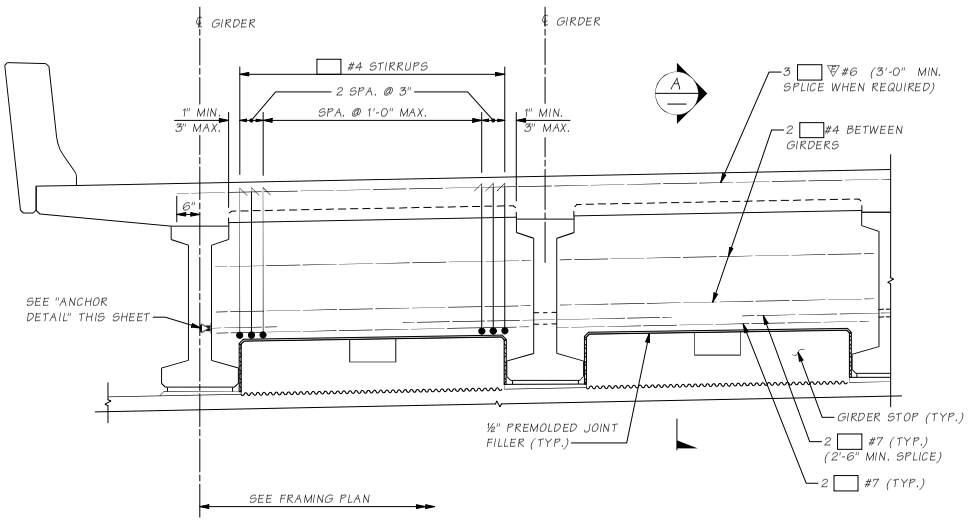
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET ____

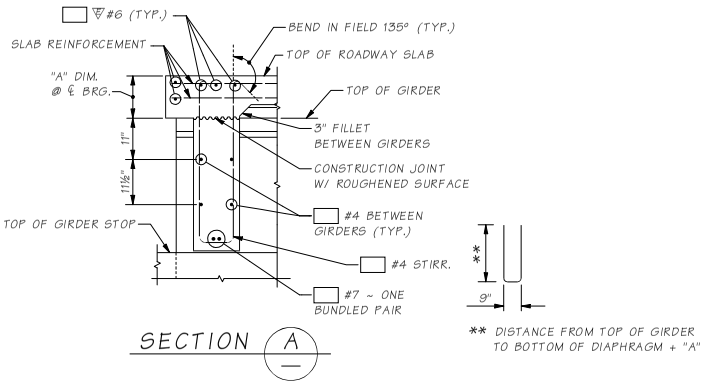
5.6-A3-3

Fri Jan 26 13:06:14 2007

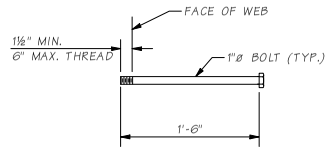


ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM

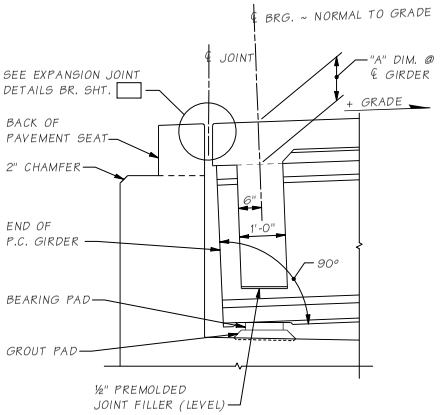


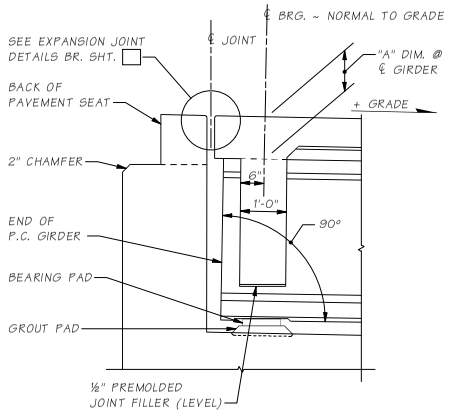
SECTION A



ANCHOR DETAIL

ASTM A-307





ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

TEMPORARY STRAND CUTTING SEQUENCE

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

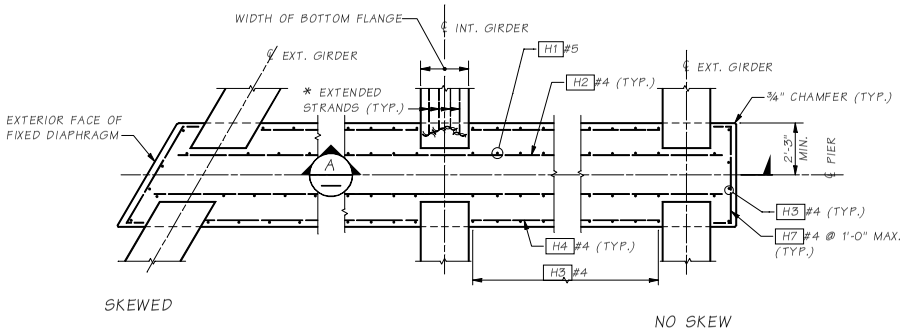
1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W42G ABUTMENT TYPE PIER DIAPHRAGM DETAILS
Detailed By										BRIDGE SHEET NO.
Bridge Projects Engr.										SHEET OF SHEETS
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

SR ____ JOB NO. ____ SHEET ____

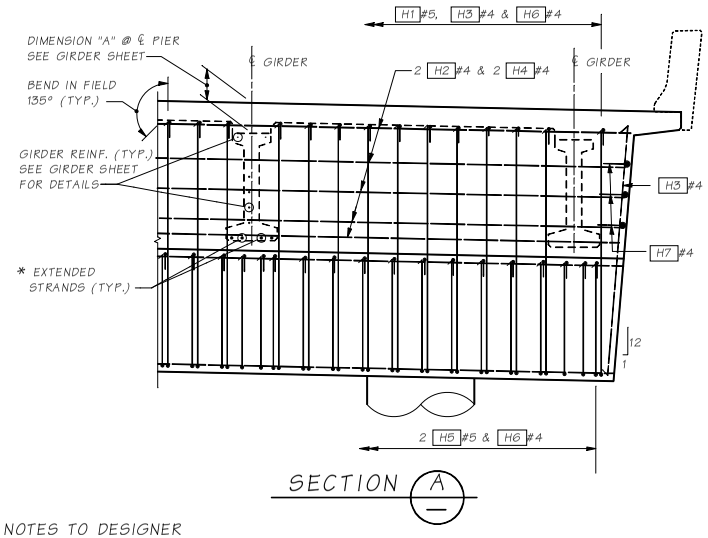
5-6-A3-4

Fri Jan 26 13:06:18 2007



PLAN - FIXED FLUSH-FACE DIAPHRAGM

* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



SECTION A

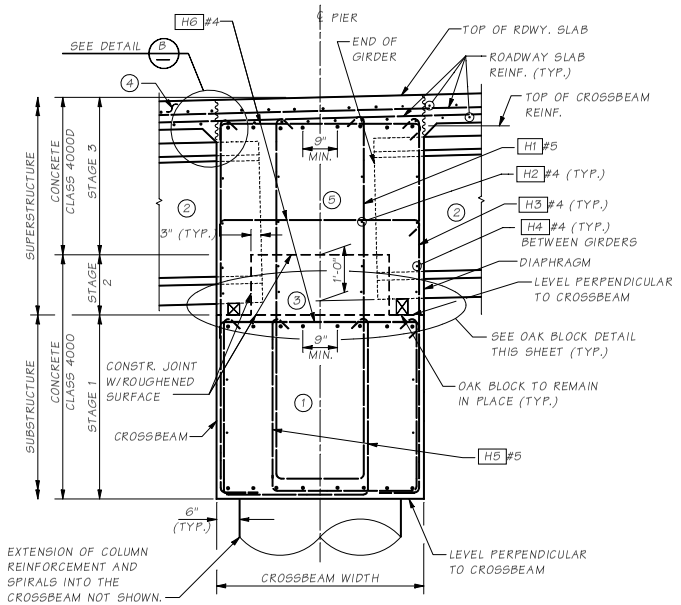
NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

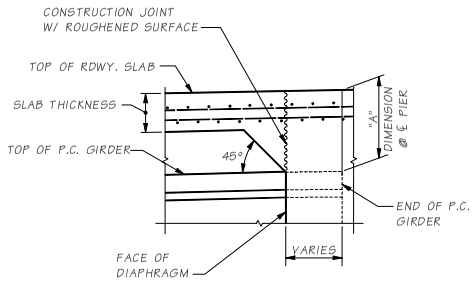
Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

CONSTRUCTION SEQUENCE

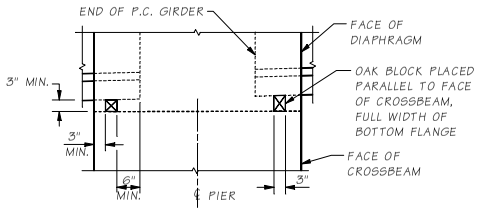
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED FLUSH-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

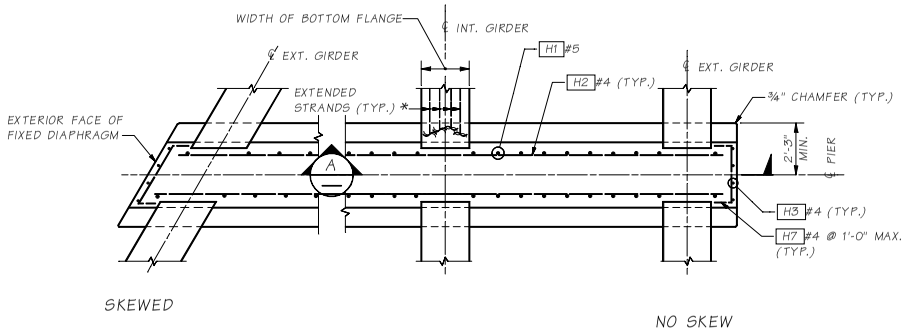
W42G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

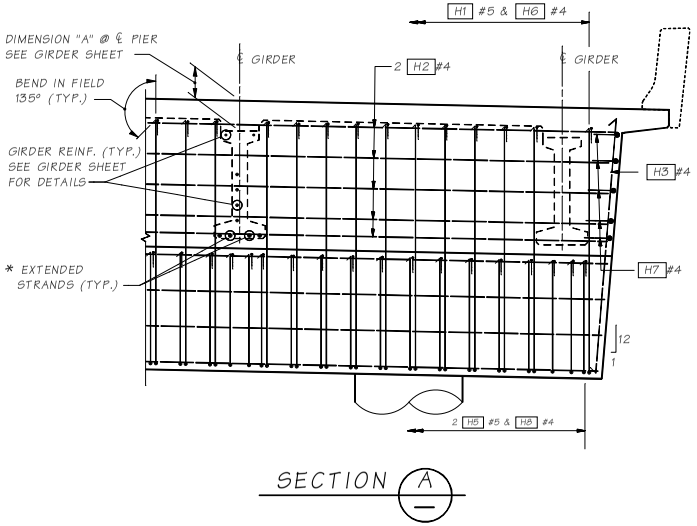
SR JOB NO. SHEET 5.6-A3-5

Wed Apr 26 08:03:56 2006



PLAN - FIXED RECESSED-FACE DIAPHRAGM

* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



SECTION A

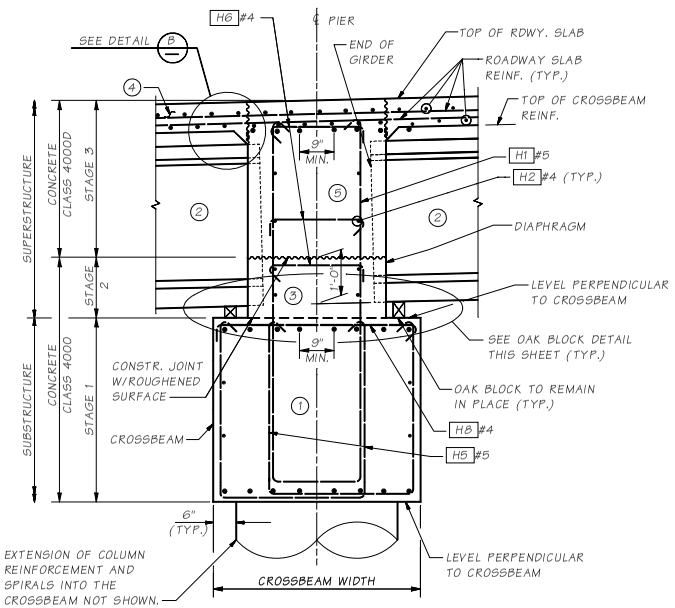
NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

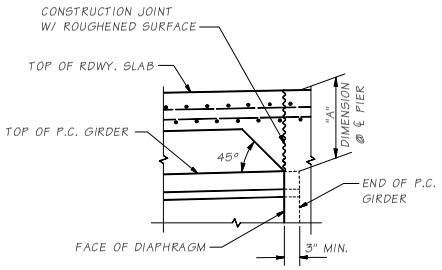
Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

CONSTRUCTION SEQUENCE

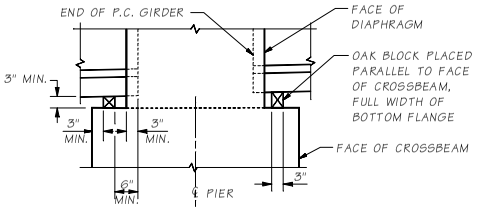
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED RECESSED-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Wed Apr 26 08:03:50 2006

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

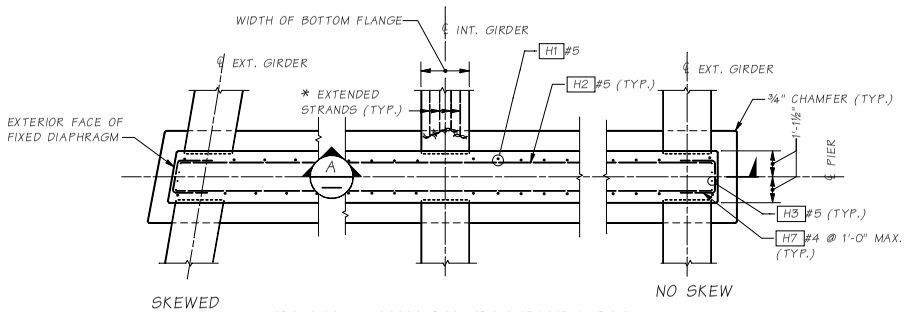
STANDARD PRESTRESSED CONCRETE GIRDERS

W42G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO. | SHEET | OF | SHEETS

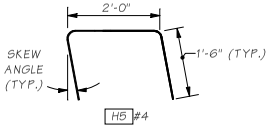
SR JOB NO. SHEET

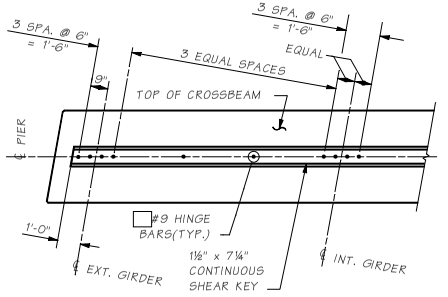
5.6-A3-6



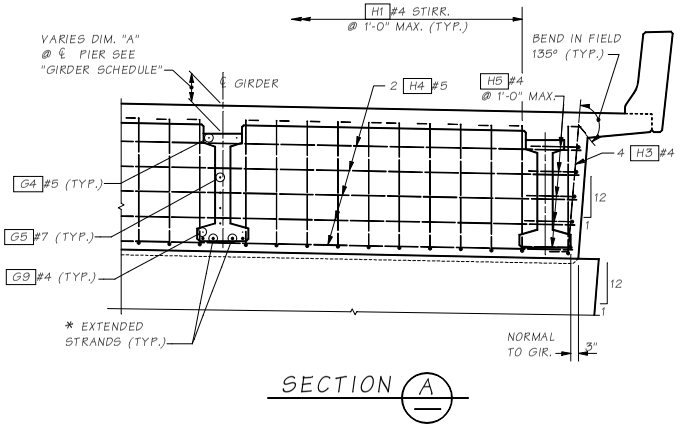
PLAN - HINGE DIAPHRAGM

10° MAX. SKEW FOR HINGE DIAPHRAGM.
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET

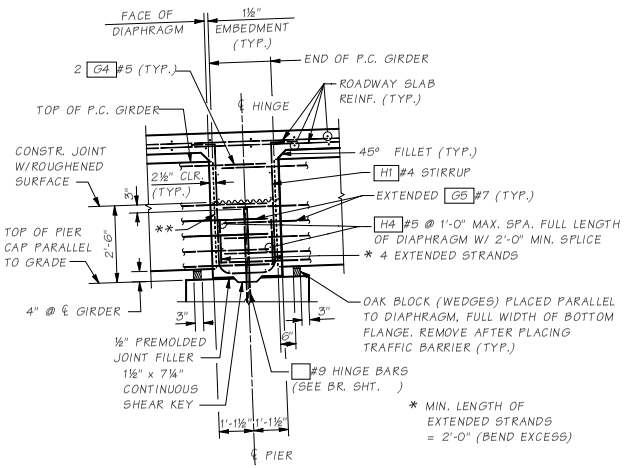




HINGE BAR PLAN

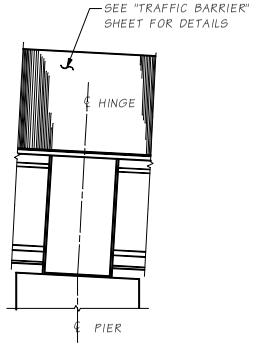


SECTION A



TYPICAL HINGE SECTION

** FOR SAWTOOTH SHEAR KEY DETAILS, SEE GIRDER SHEETS.



TYP. END VIEW HINGE DIAPHRAGM

NOTES TO DESIGNER

Hinge bar plan is shown for designer. The actual hinge bars shall be located along the ℄ pier on the crossbeam details sheet, for final contract plans. The hinge bars shall be deleted from this sheet prior to the award copy of the contract plans.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by the oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_HINGE_DIAPHRAGM_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

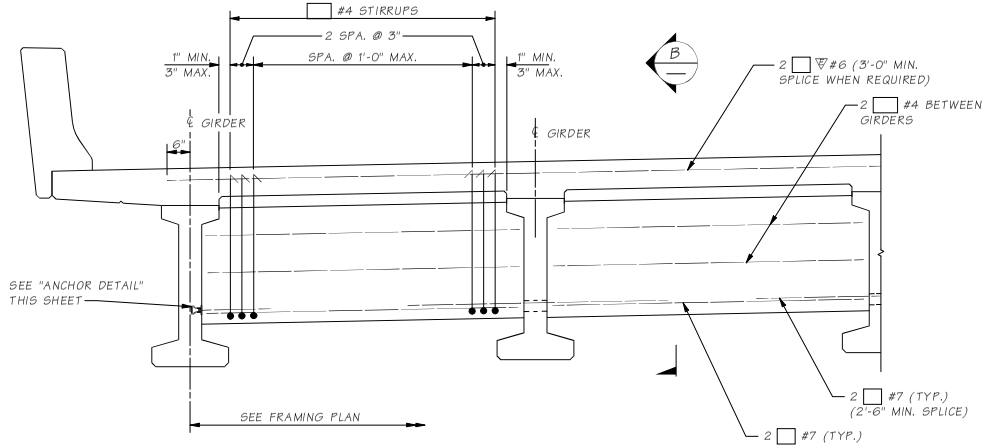
W42G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

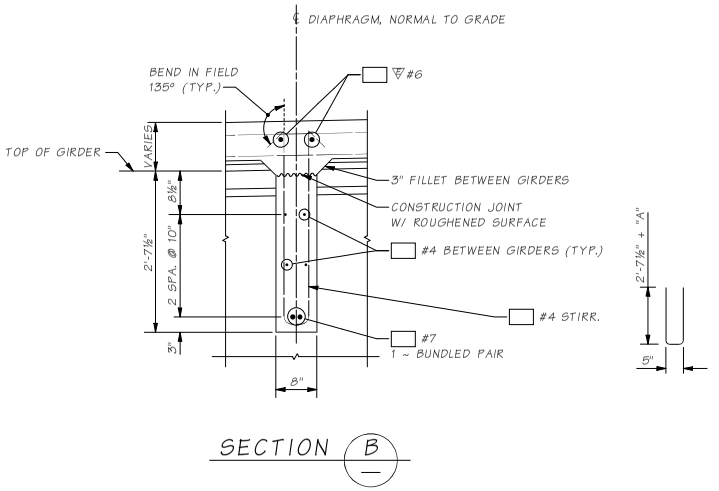
SR JOB NO. SHEET 5.6-A3-7

Wed Apr 26 08:03:44 2006

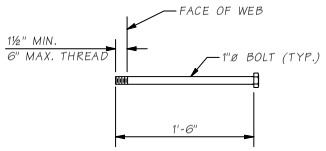


ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION B



ANCHOR DETAIL

ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				
Designed By					JOB NUMBER					
Checked By										
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

Washington State Department of Transportation

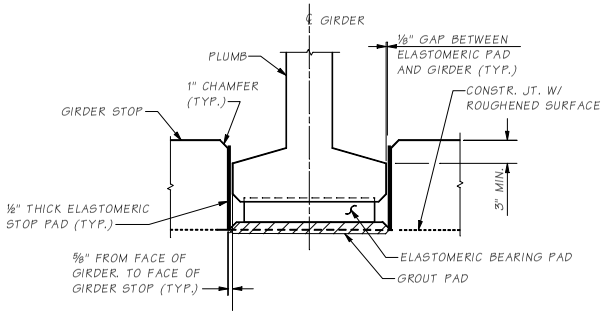
STANDARD PRESTRESSED CONCRETE GIRDERS

W42G INTERMEDIATE DIAPHRAGM DETAILS

BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR ____ SHEET ____ JOB NO. 5.6-A3-8

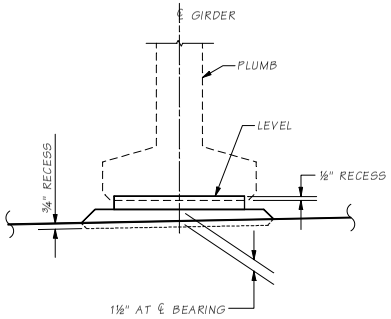
Fri Jan 26 13:06:29 2007



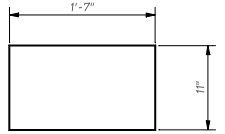
SECTION G

NOTE:

1. GIRDER STOPS SHALL BE CONSTRUCTED AFTER PLACEMENT OF PRESTRESSED GIRDERS.
2. ELASTOMERIC PADS BETWEEN GIRDER AND GIRDER STOPS SHALL BE PLACED AFTER CONSTRUCTING THE GIRDER STOPS. THE PADS SHALL BE COATED WITH APPROVED CEMENTITIOUS ADHESIVE PRIOR TO INSTALLATION.

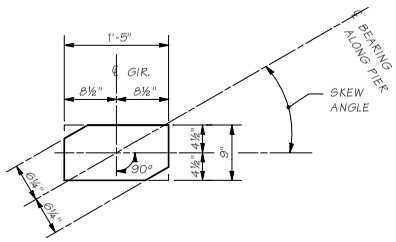


GROUT PAD ELEVATION



ELASTOMERIC STOP PAD

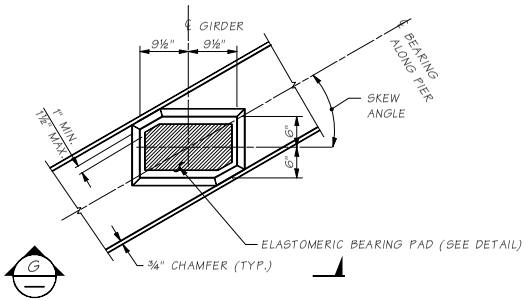
DUROMETER HARDNESS = 60



ELASTOMERIC BEARING PAD

LAMINATED ELASTOMERIC BRIDGE PAD ☐ THICK (☐ SHIMS)
DUROMETER HARDNESS = 60

(30 DEG. SKEW ANGLE SHOWN)



GROUT PAD DETAIL

(SKEW ANGLE SHOWN @ 30°)
(SHOWN FOR END DIAPHRAGM ON GIRDER)

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\W42G_MISC_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

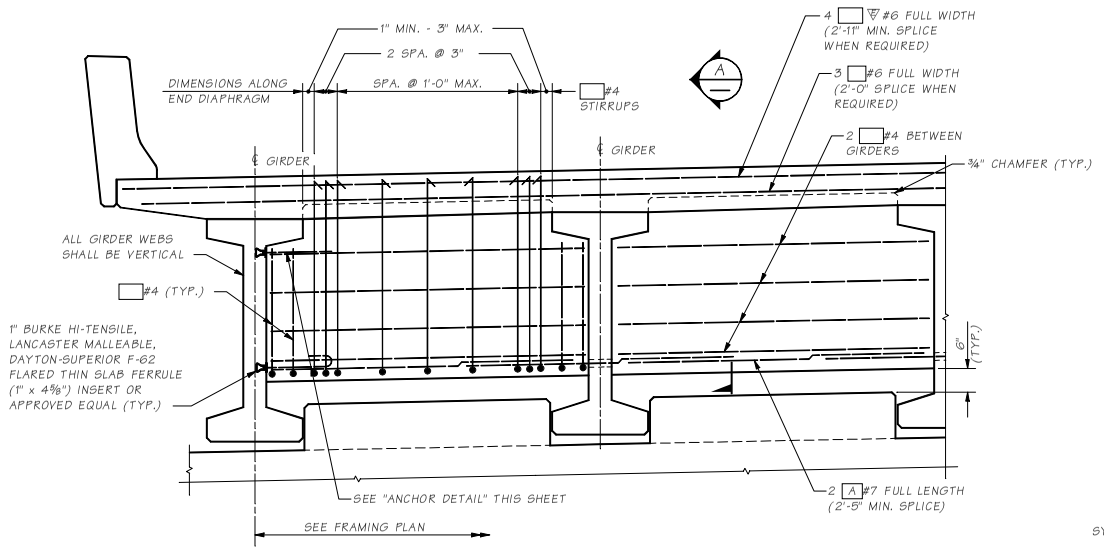
W42G MISCELLANEOUS BEARING DETAILS

BRIDGE SHEET NO.

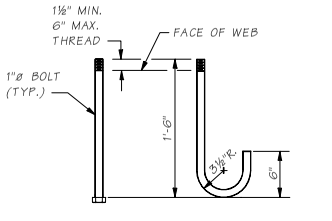
SHEET OF SHEETS

SR JOB NO. SHEET 5.6-A3-9

Thu Jan 11 11:51:04 2007

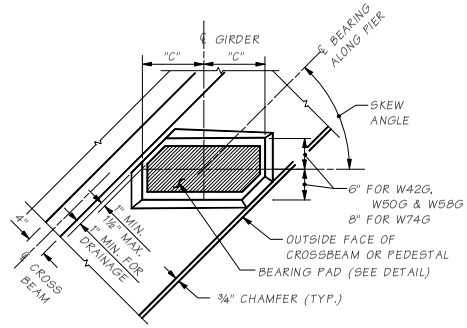


TYPICAL END TYPE "B" DIAPHRAGM AT END PIERS

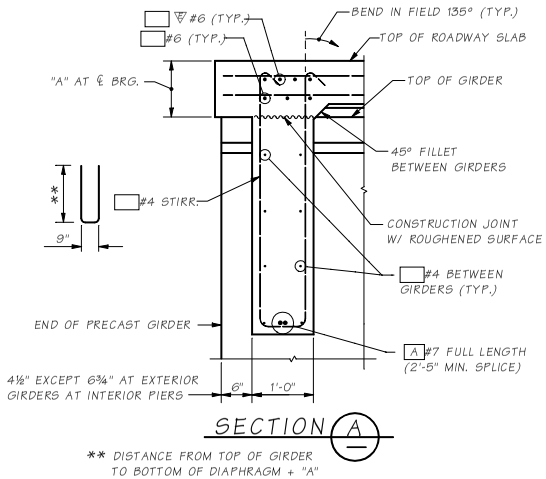


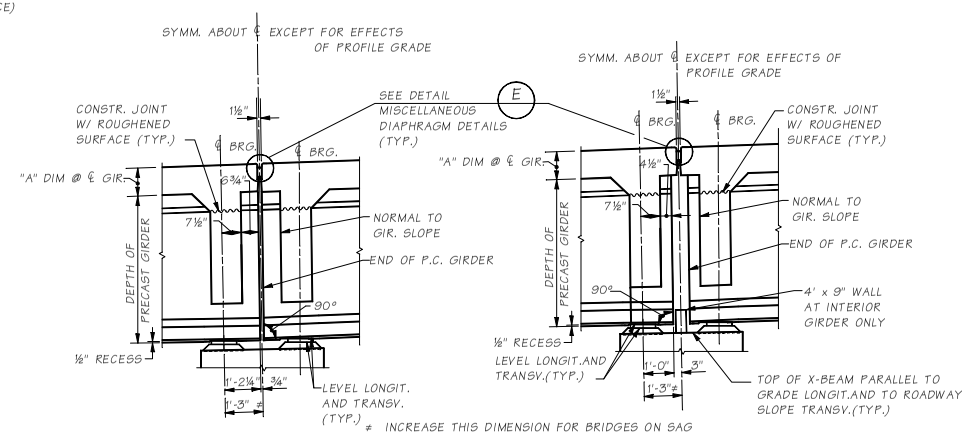
ANCHOR DETAIL

A.S.T.M. A-307



BEARING PAD DETAILS AT INTERMEDIATE PIERS





SECT. THRU END DIAPH. EXTERIOR GIRDER AT INTERMEDIATE PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
NOT TO BE USED WITH SERIES W83G & W95G GIRDERS.
SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A."

SECT. THRU END DIAPH. INTERIOR GIRDER AT INTERMEDIATE PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
NOT TO BE USED WITH SERIES W83G & W95G GIRDERS.
SEE "GIRDER DETAILS" FOR DIMENSION "A."

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE PLANS FOR "TRAFFIC BARRIER" DIMENSIONS AND LOCATION. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W42G\MULTISPAN_END_WALL.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

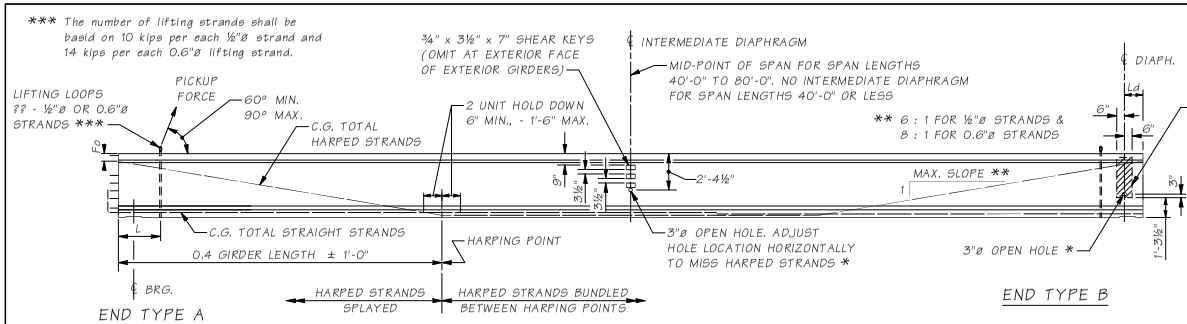
STANDARD DIAPHRAGMS

MULTIPLE SIMPLE SPANS INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO. — SHEET — OF — SHEETS

SHEET — JOB NO. — SR 5.6-A3-10

Wed Apr 26 08:03:21 2006

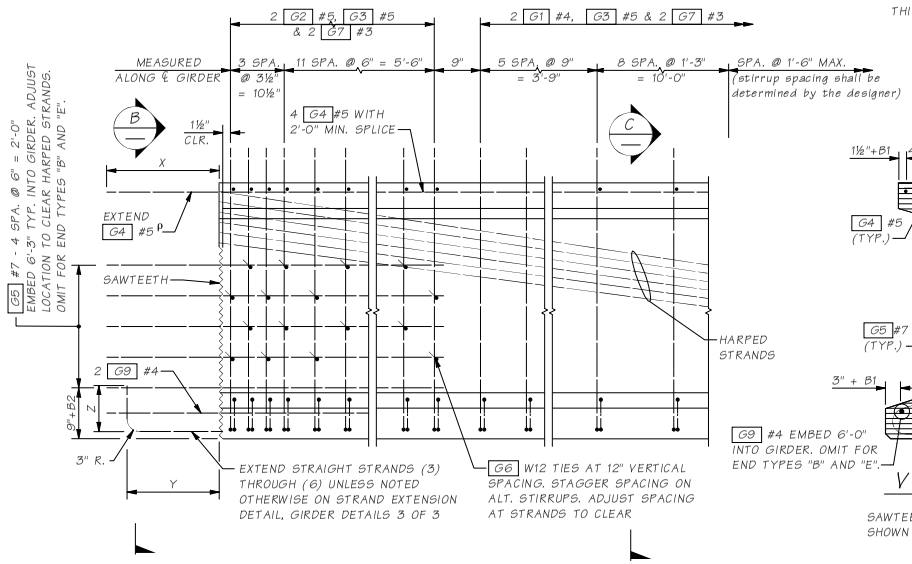


GIRDER ELEVATION

* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)

NOTES

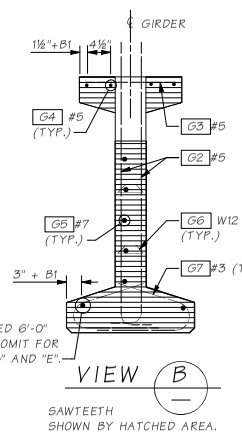
1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WUAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER .
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE W50G GIRDER DETAILS 2 OF 2.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.



TYPICAL END ELEVATION

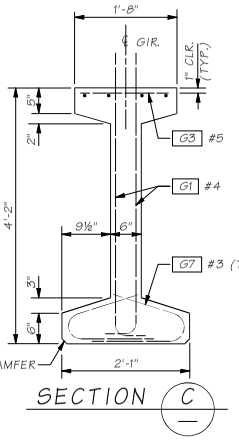
END OF TYPE C SHOWN, OTHER END TYPES SIMILAR

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B

SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

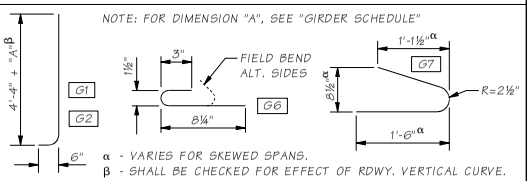
Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	4	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	4	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G1.man							
Supervisor				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By				10	WASH.			
Checked By				JOB NUMBER				
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

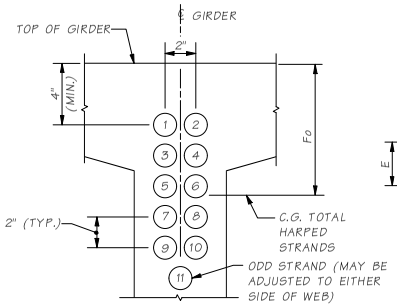
W50G GIRDER DETAILS 1 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

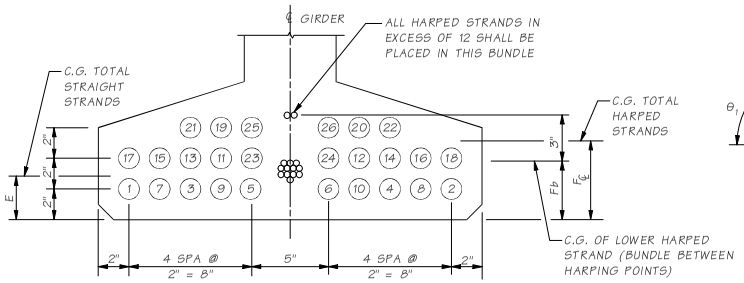
SR JOB NO. SHEET 5.6-A4-1

Fri Jan 26 13:06:51 2007



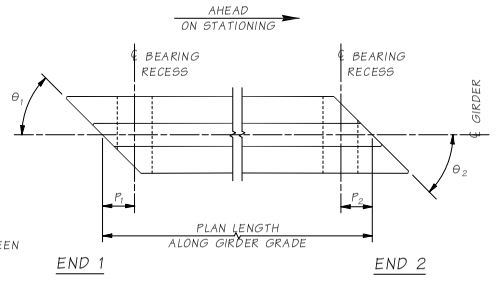
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.

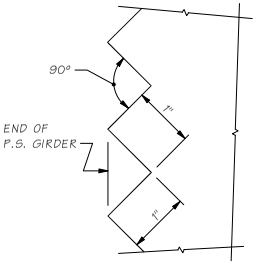


STRAND PATTERN AT ℄ SPAN

STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



GIRDER SCHEDULE

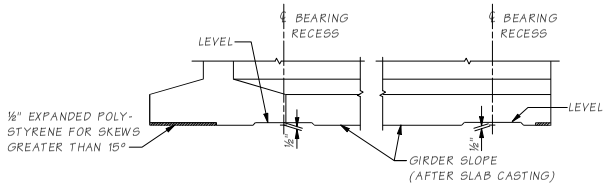


SAWTOOTH DETAILS

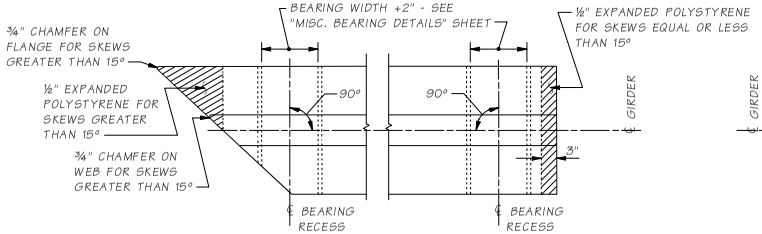
SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - W50G GIRDER DETAILS 1 OF 2

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

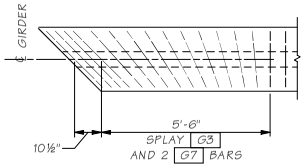
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'Ci (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

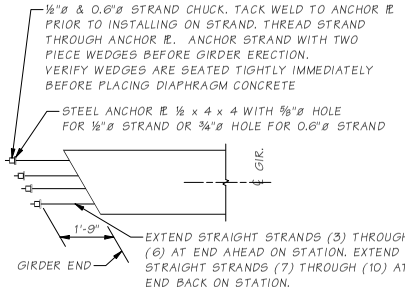


PLAN
BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION

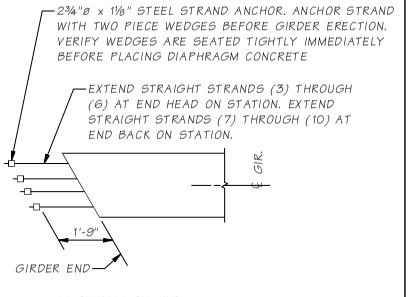


TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



ALTERNATE #1



ALTERNATE #2

STRAND EXTENSION DETAIL

n = ? TOTAL NUMBER OF EXTENDED STRANDS

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G2.man								
Supervisor									
Designed By									
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH.			
JOB NUMBER				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

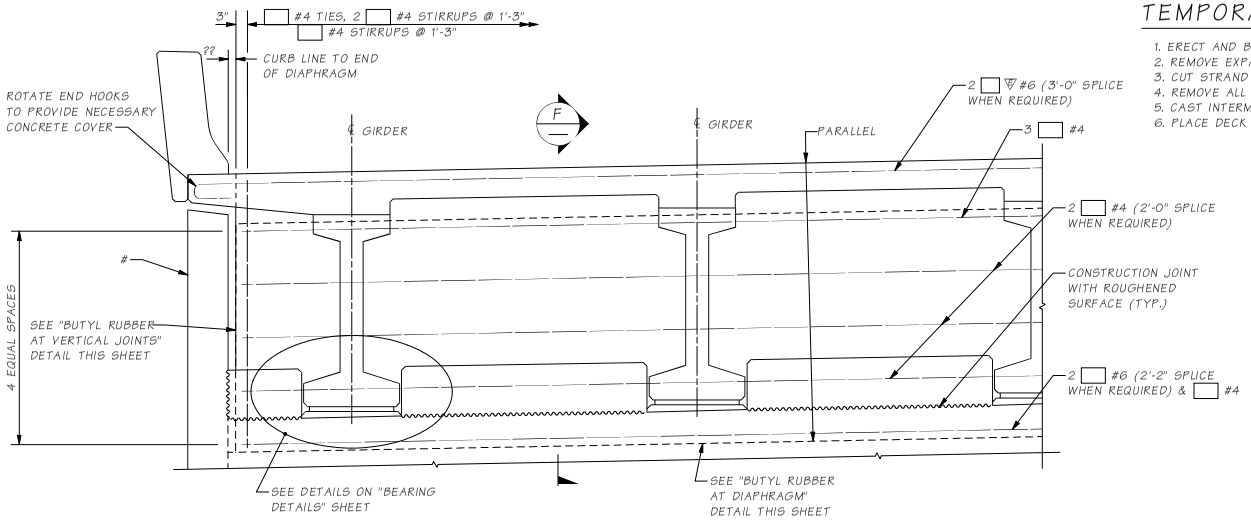
W50G GIRDER DETAILS 2 OF 2

BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR | JOB NO. | SHEET

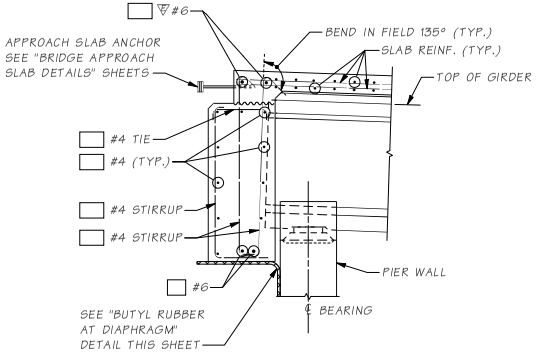
5.6-A4-2

Fri Jan 26 13:06:45 2007



TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



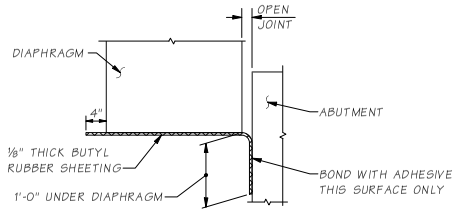
SECTION F

NOTE TO DESIGNER

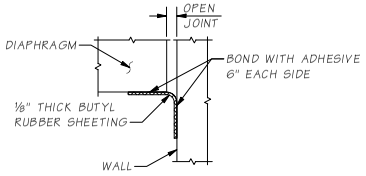
If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.

ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ELEVATION BUTYL RUBBER AT DIAPHRAGM

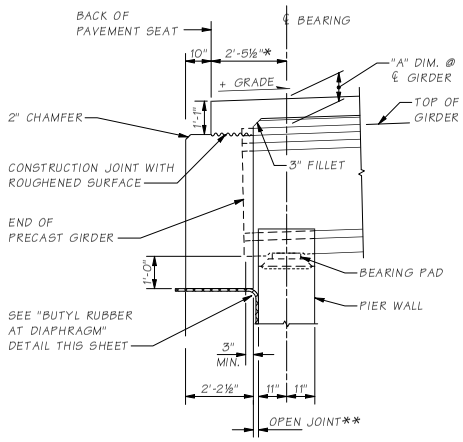


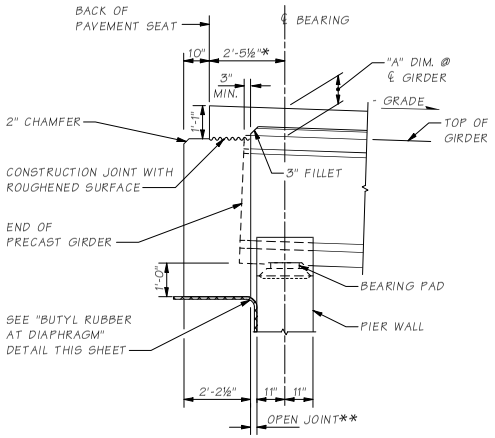
PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint

NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.





END DIAPHRAGM GEOMETRY

SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_END_DIA_ON_GIR.MAN							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By									
Detailed By					JOB NUMBER				
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

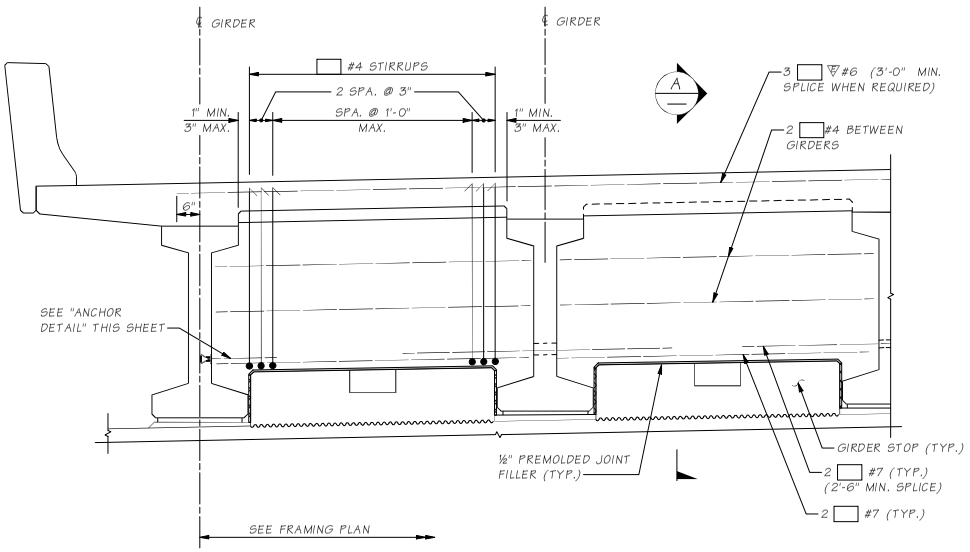
W50G END DIAPHRAGM ON GIRDER DETAILS

BRIDGE SHEET NO.
SHEET
OF
SHEETS

SR ____ JOB NO. ____ SHEET

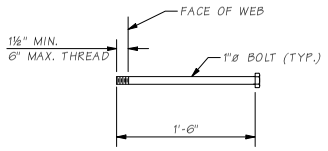
5.6-A4-3

Fri Jan 26 13:06:34 2007



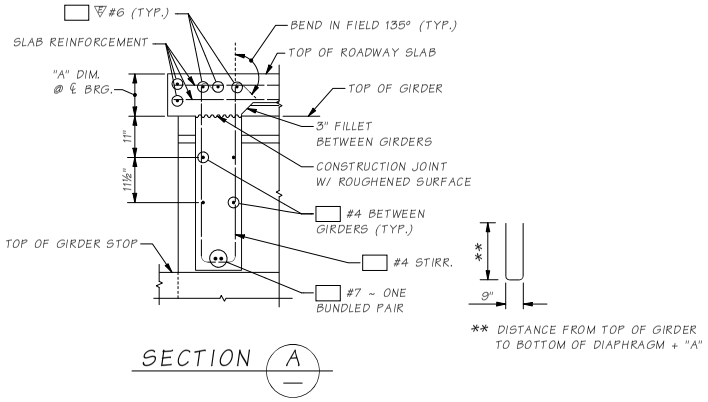
ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ANCHOR DETAIL

ASTM A-307



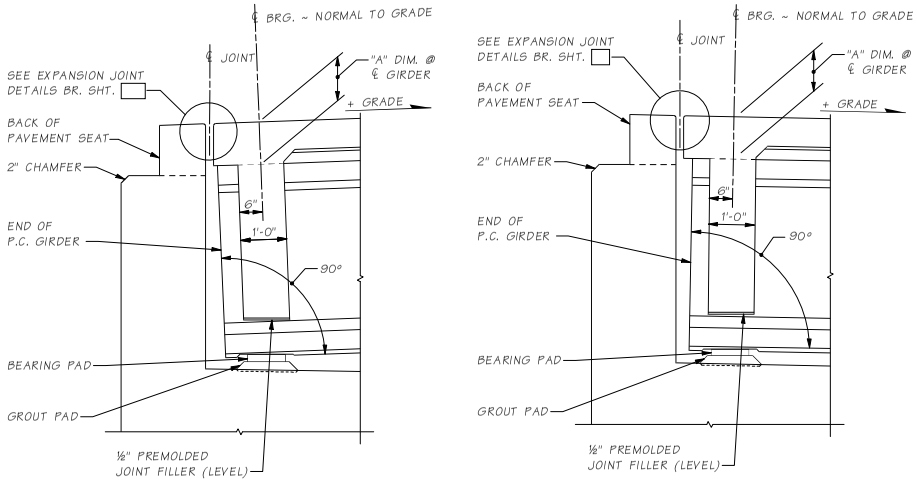
SECTION A

TEMPORARY STRAND CUTTING SEQUENCE

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

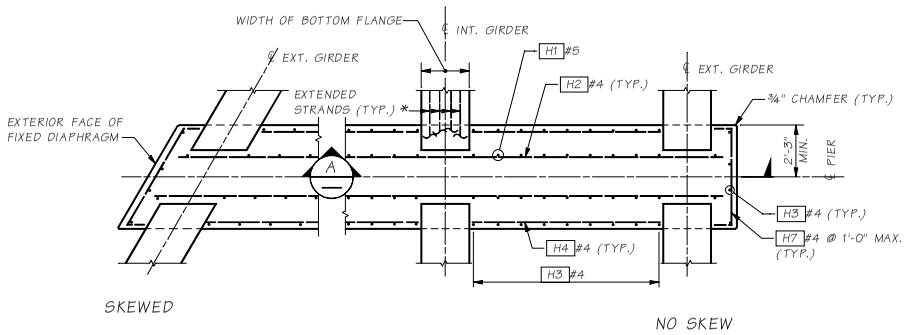
STANDARD PRESTRESSED CONCRETE GIRDERS

W50G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

BRIDGE SHEET NO.
SHEET
OF
SHEETS

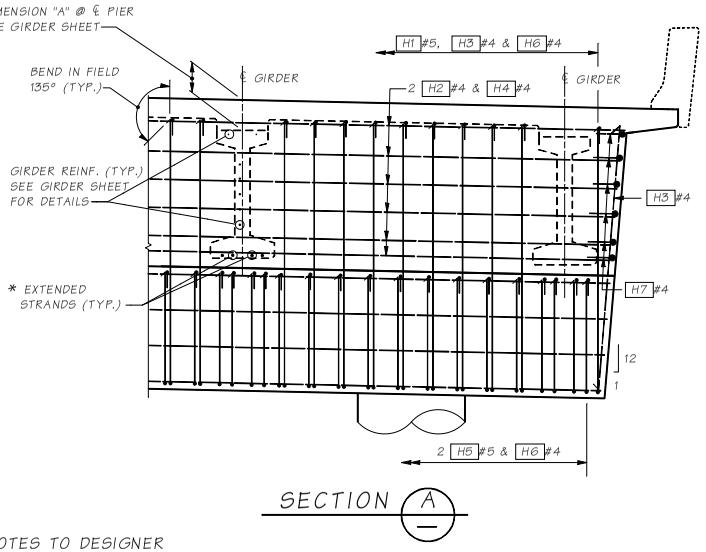
SR 5.6-A4-4 JOB NO. SHEET

Fri Jan 26 13:06:40 2007



PLAN - FIXED FLUSH-FACE DIAPHRAGM

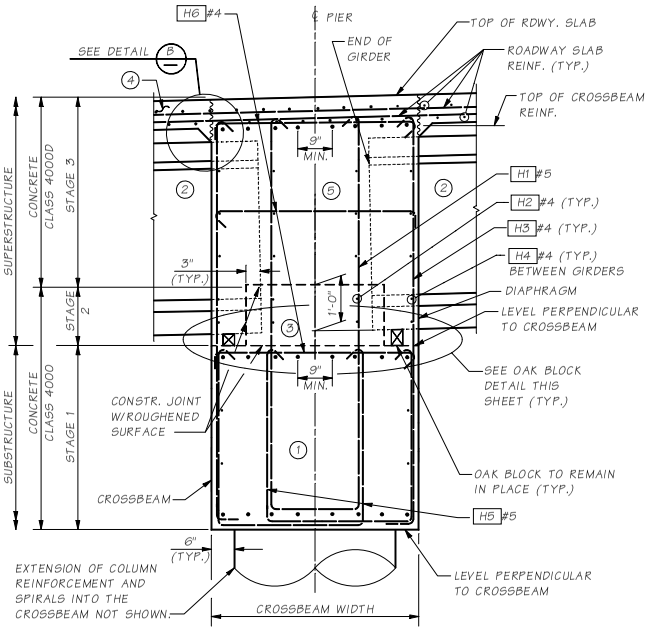
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



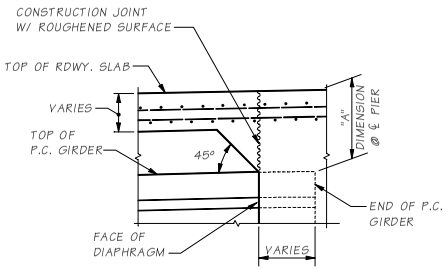
SECTION A

CONSTRUCTION SEQUENCE

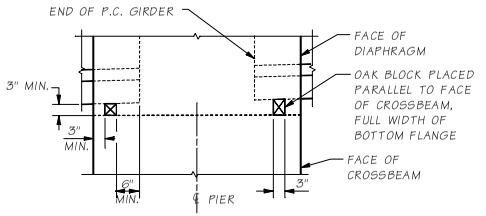
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED FLUSH-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

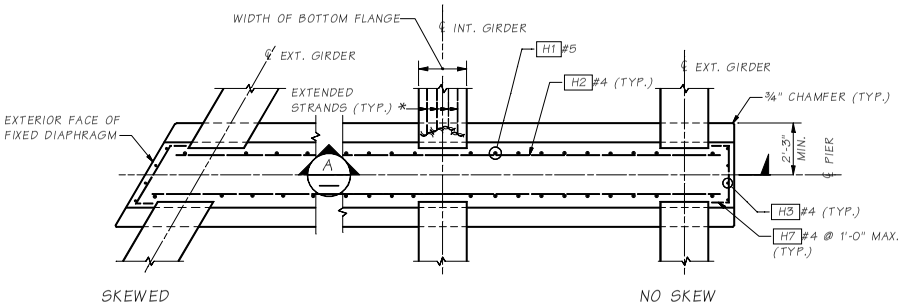
W50G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

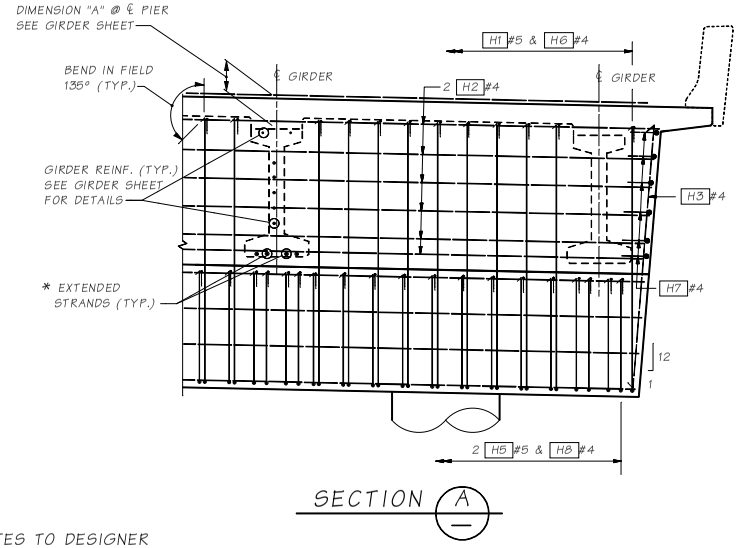
SR JOB NO. SHEET 5.6-A4-5

Wed Apr 26 08:05:13 2006



PLAN - FIXED RECESSED-FACE DIAPHRAGM

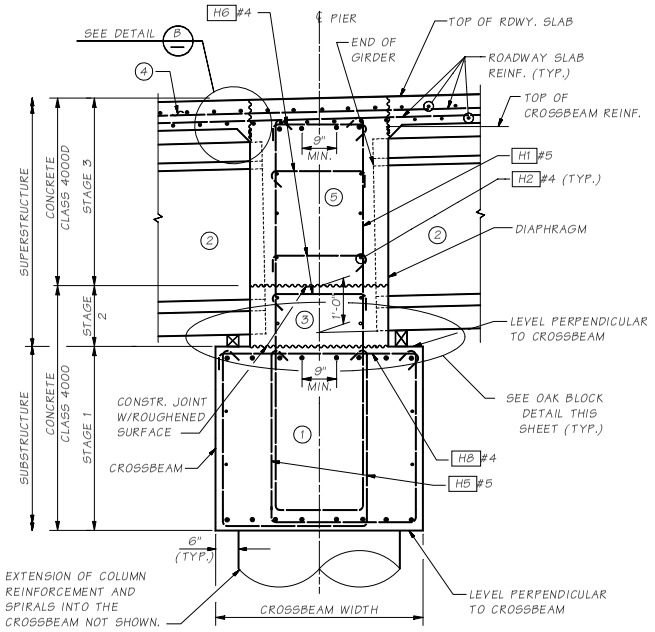
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



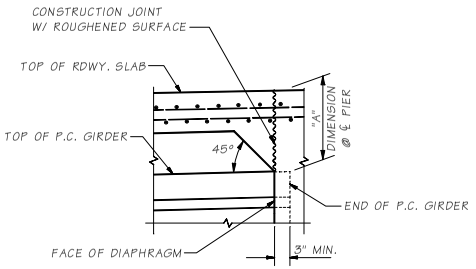
SECTION A

CONSTRUCTION SEQUENCE

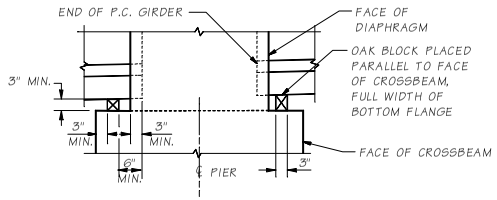
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED RECESSED-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

NOTES TO DESIGNER

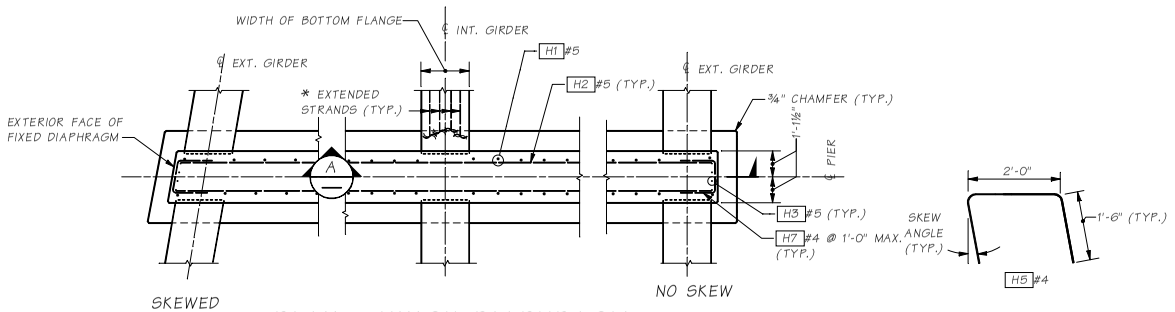
Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W50G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS
Detailed By										BRIDGE SHEET NO. / SHEET / OF / SHEETS
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

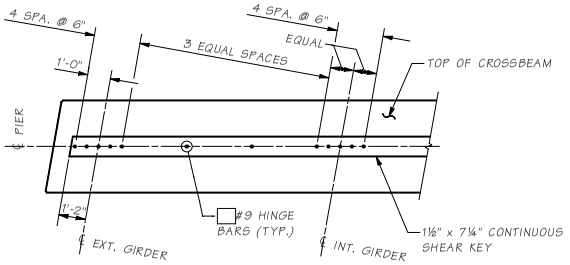
Wed Apr 26 08:05:25 2006

SR JOB NO. SHEET 5.6-A4-6

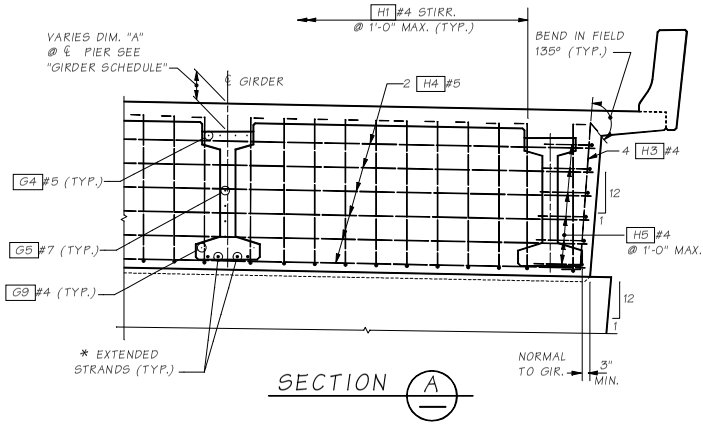


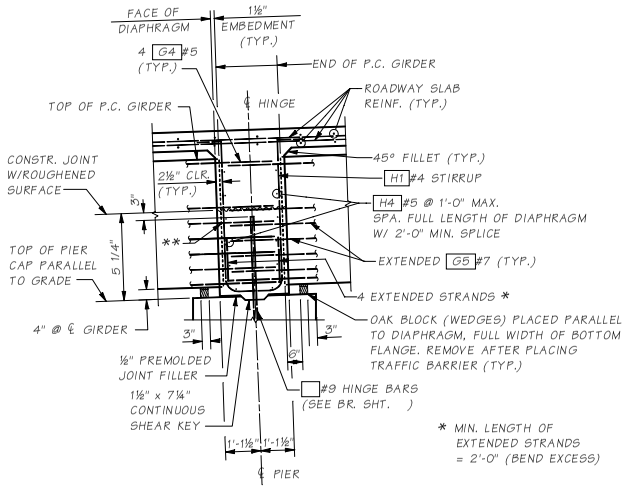
PLAN - HINGE DIAPHRAGM

10° MAX. SKEW FOR HINGE DIAPHRAGM.
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



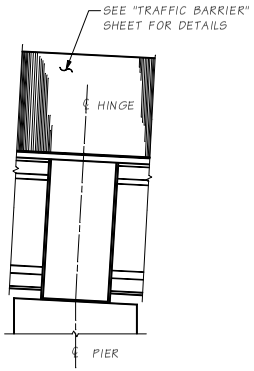
HINGE BAR PLAN





TYPICAL HINGE SECTION

** FOR SAWTOOTH SHEAR KEY DETAILS, SEE GIRDER SHEETS.



TYP. END VIEW HINGE DIAPHRAGM

NOTES TO DESIGNER

Hinge bar plan is shown for designer. The actual hinge bars shall be located along the ℄ pier on the crossbeam details sheet, for final contract plans. The hinge bars shall be deleted from this sheet prior to the award copy of the contract plans.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by the oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_HINGE_DIAPHRAGM_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

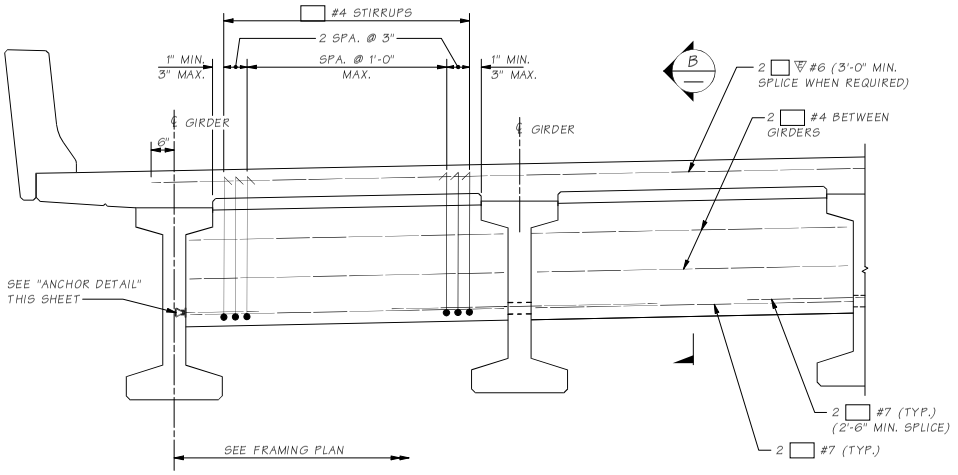
W50G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

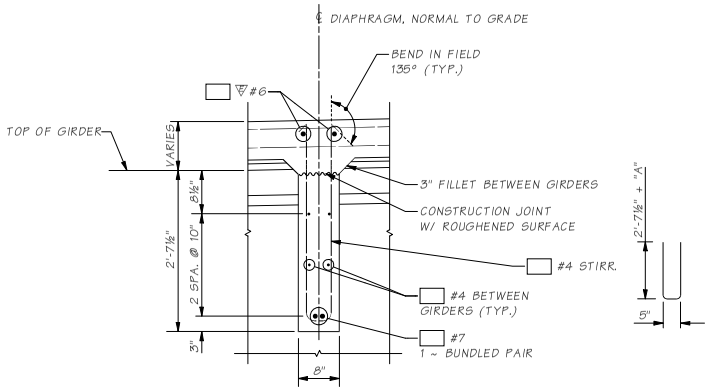
SR JOB NO. SHEET 5.6-A4-7

Wed Apr 26 08:05:01 2006

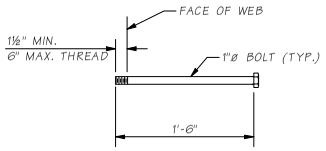


ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION B



ANCHOR DETAIL

ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

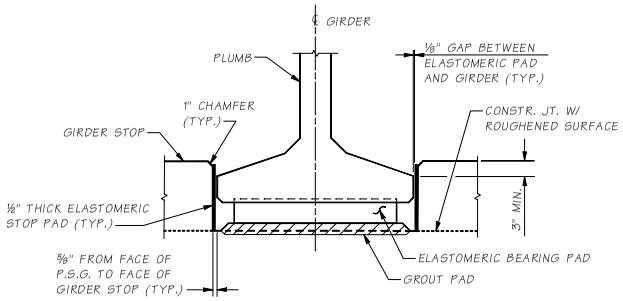
W50G INTERMEDIATE DIAPHRAGM DETAILS

BRIDGE SHEET NO. SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET ____

5.6-A4-8

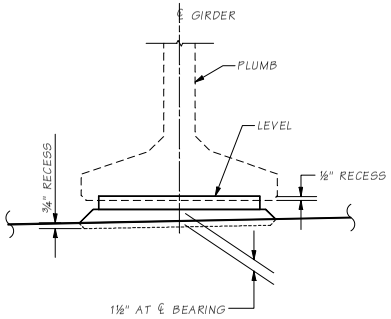
Fri Jan 26 13:06:57 2007



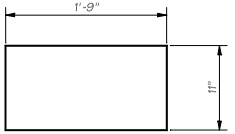
SECTION G

NOTE:

1. GIRDER STOPS SHALL BE CONSTRUCTED AFTER PLACEMENT OF PRESTRESSED GIRDERS.
2. ELASTOMERIC PADS BETWEEN GIRDER AND GIRDER STOPS SHALL BE PLACED AFTER CONSTRUCTING THE GIRDER STOPS. THE PADS SHALL BE COATED WITH APPROVED CEMENTITIOUS ADHESIVE PRIOR TO INSTALLATION.

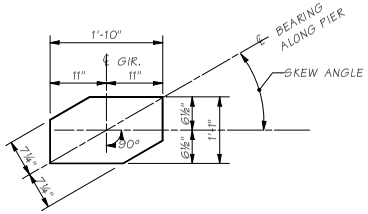


GROUT PAD ELEVATION



ELASTOMERIC STOP PAD

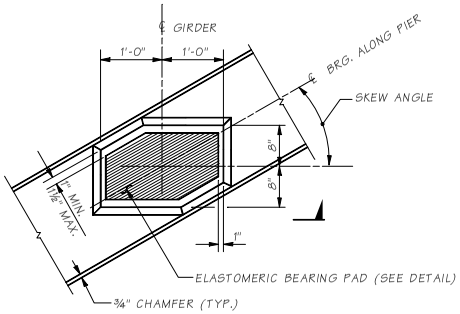
DUROMETER HARDNESS = 60



ELASTOMERIC BEARING PAD

LAMINATED ELASTOMERIC BRIDGE PAD ☐ THICK (☐ SHIMS)

(SKEW ANGLE SHOWN @ 30°)



GROUT PAD DETAIL

(SKEW ANGLE SHOWN @ 30°)
(SHOWN FOR END DIAPHRAGM ON GIRDER)

BEARING DESIGN TABLE	
SERVICE - 1 LIMIT STATE	
DEAD LOAD REACTION	KIPS
LIVE LOAD REACTION (W/O IMPACT)	KIPS
UNLOADED HEIGHT	IN.
LOADED HEIGHT (DL)	IN.
DUROMETER HARDNESS	

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W50G\W50G_MISC_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W50G MISCELLANEOUS BEARING DETAILS

BRIDGE SHEET NO.

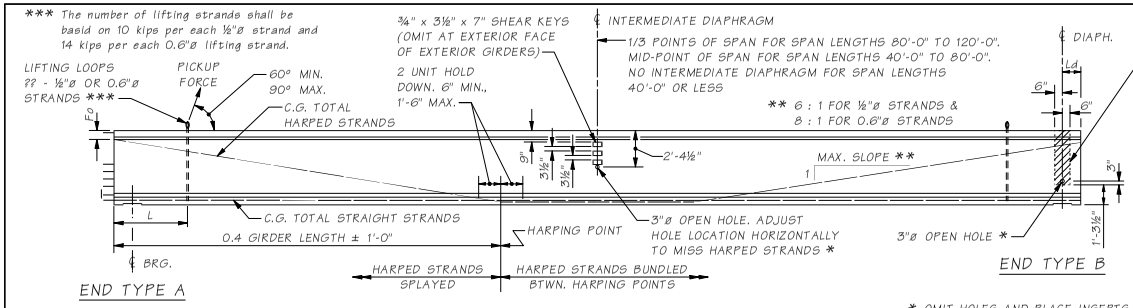
SHEET OF SHEETS

SHEET

JOB NO. SR 5.6-A4-9

Thu Jan 11 11:51:15 2007

*** The number of lifting strands shall be basid on 10 kips per each ½"ø strand and 14 kips per each 0.6"ø lifting strand.

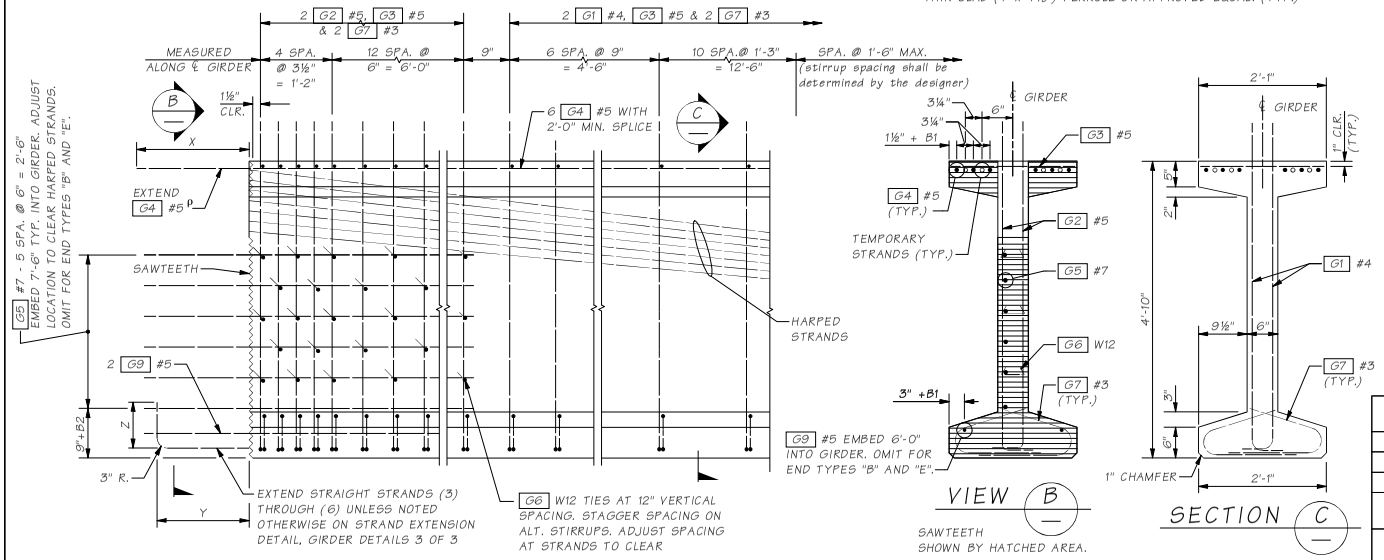


GIRDER ELEVATION

* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)

NOTES:

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WRAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE W58G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.



TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.

VIEW B

SAWTEETH SHOWN BY HATCHED AREA.

SECTION C

Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

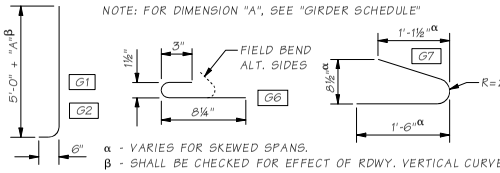
FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	4	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	5	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G1.man							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

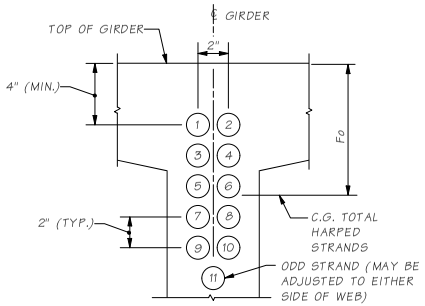
STANDARD PRESTRESSED CONCRETE GIRDERS

W58G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO. ____ SHEET ____ OF ____ SHEETS

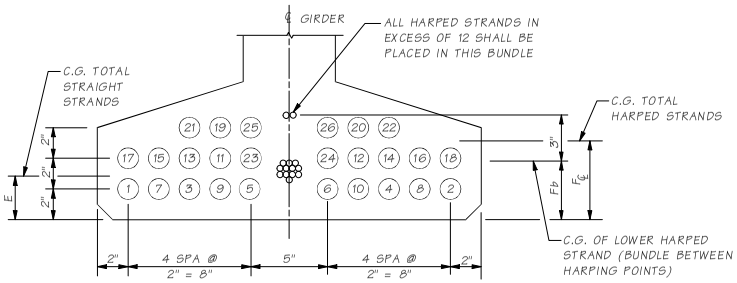
SR ____ JOB NO. 5.6-A5-1

Fri Jan 26 13:07:24 2007



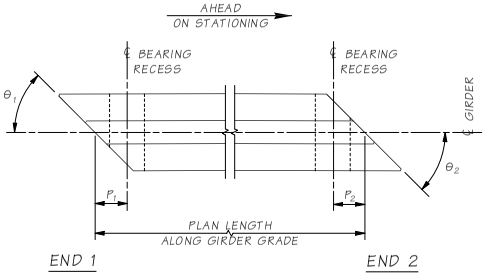
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

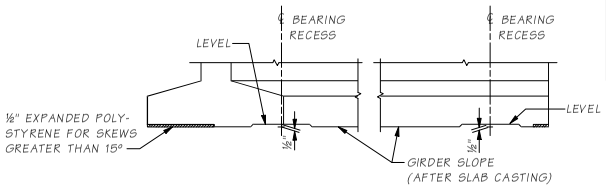
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



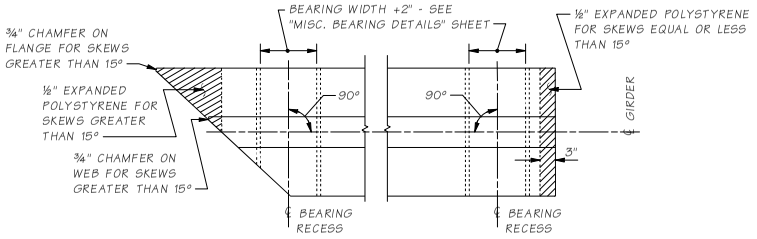
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

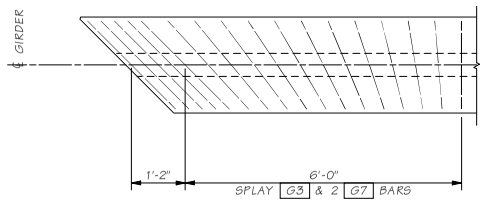
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ_1	θ_2	P_1	P_2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'c (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'ci (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Δf (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

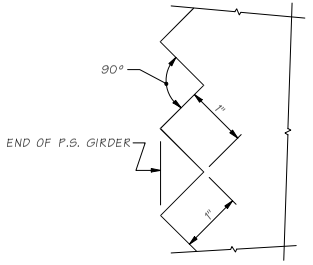


PLAN
BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

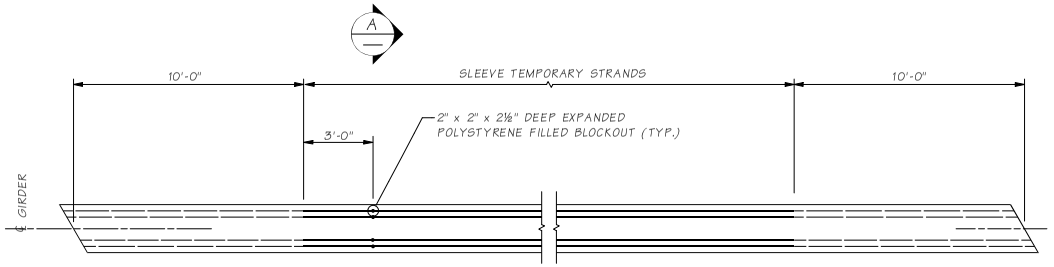
SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - W58G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W58G GIRDER DETAILS 2 OF 3
Detailed By										BRIDGE SHEET NO.
Bridge Projects Engr.										SHEET OF SHEETS
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

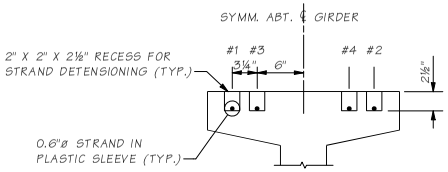
SR ____ JOB NO. ____ SHEET ____

5.6-A5-2

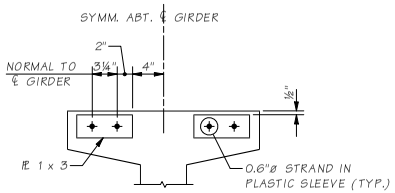
Fri Jan 26 13:07:18 2007



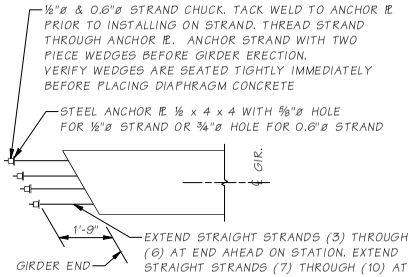
PLAN
TEMPORARY STRANDS



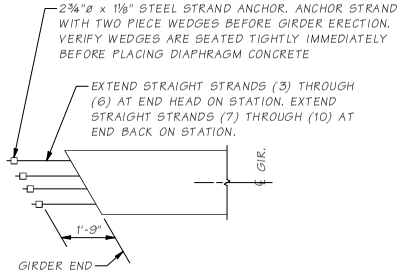
SECTION A



END VIEW
TEMPORARY STRAND
POST-TENSIONED ALTERNATE



ALTERNATE #1



ALTERNATE #2

STRAND EXTENSION DETAIL
n = ? TOTAL NUMBER OF EXTENDED STRANDS

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G3.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W58G GIRDER DETAILS 3 OF 3

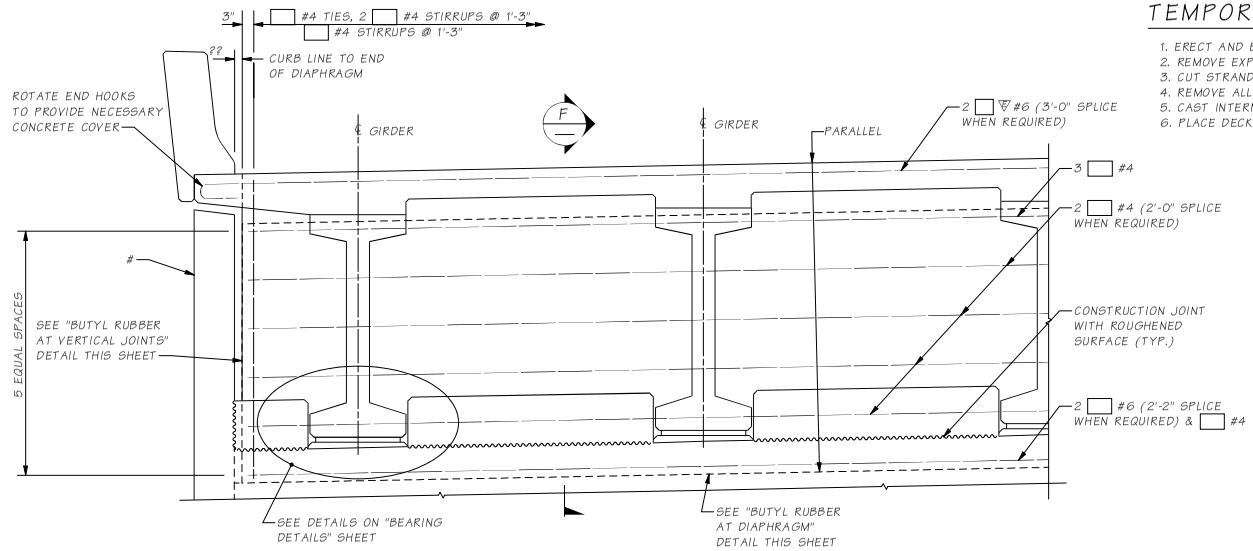
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET 3

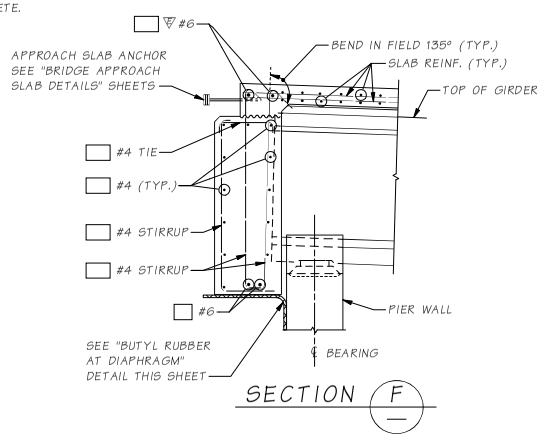
5.6-A5-3

Fri Jan 26 13:07:13 2007



TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



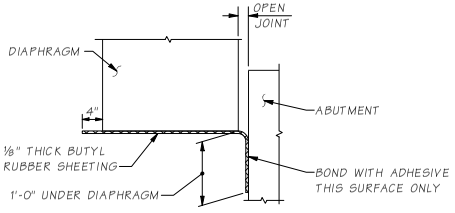
SECTION F

NOTE TO DESIGNER

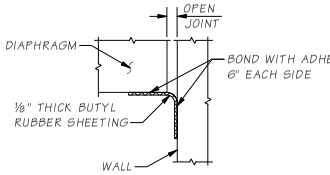
If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.

ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ELEVATION BUTYL RUBBER AT DIAPHRAGM

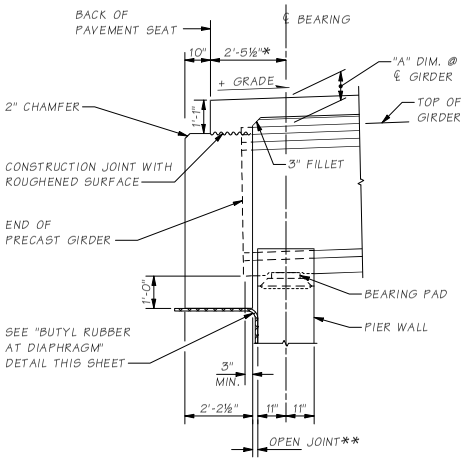


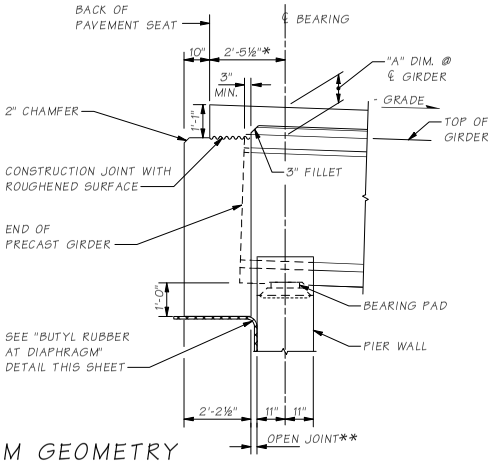
PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint

NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.





END DIAPHRAGM GEOMETRY

SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_END_DIA_ON_GIR.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

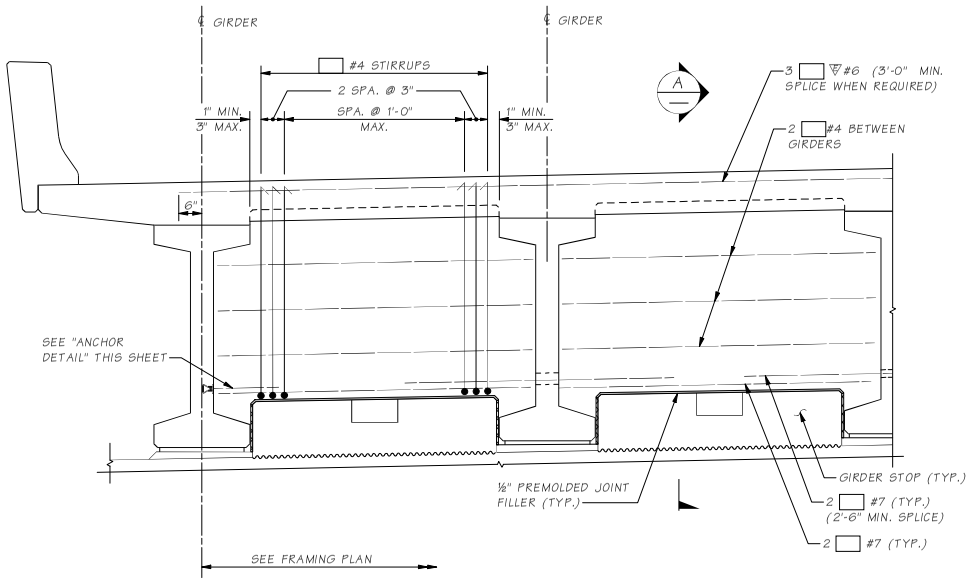
W58G END DIAPHRAGM ON GIRDER DETAILS

BRIDGE SHEET NO.
SHEET
OF
SHEETS

SR ____ JOB NO. ____ SHEET

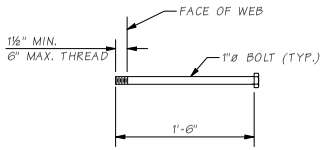
5.6-A5-4

Fri Jan 26 13:07:02 2007



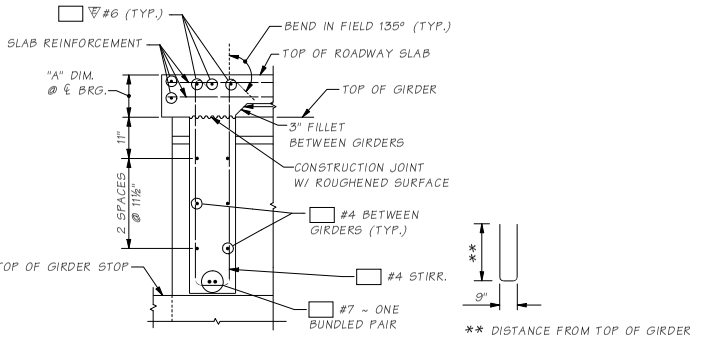
ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ANCHOR DETAIL

ASTM A-307



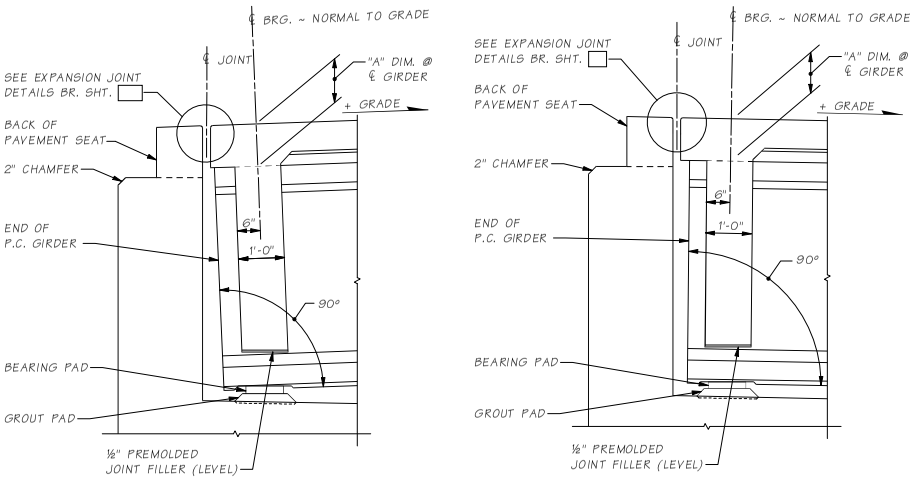
SECTION A

TEMPORARY STRAND CUTTING SEQUENCE

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor									
Designed By					10	WASH.			
Checked By									
Detailed By					JOB NUMBER				
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W58G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

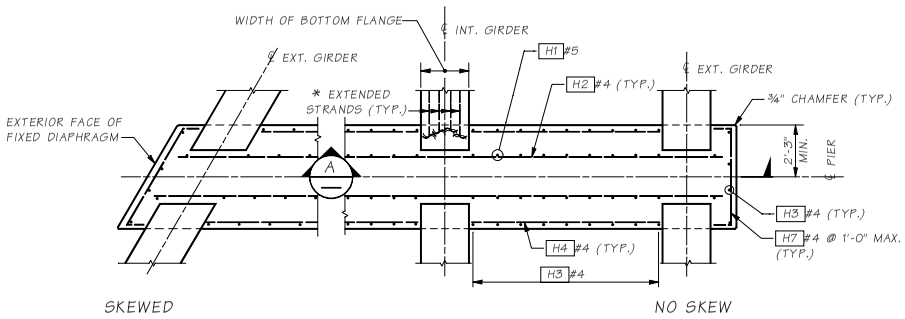
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET ____

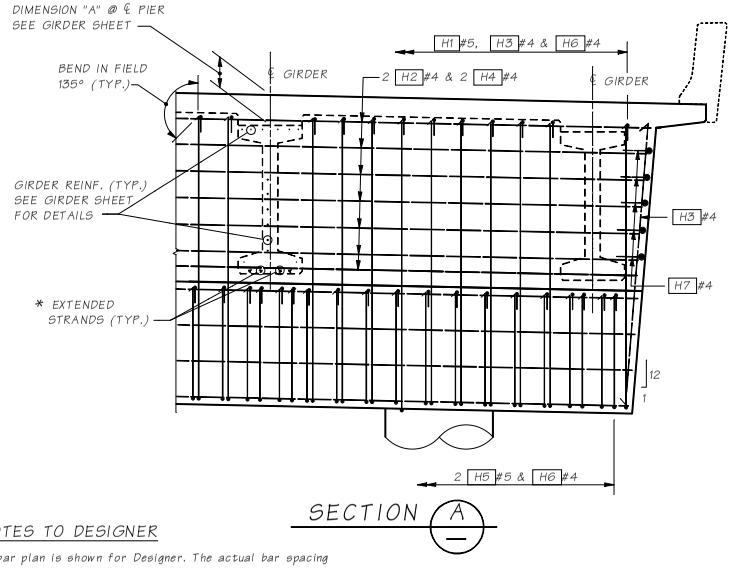
5.6-A5-5

Fri Jan 26 13:07:08 2007



PLAN - FIXED FLUSH-FACE DIAPHRAGM

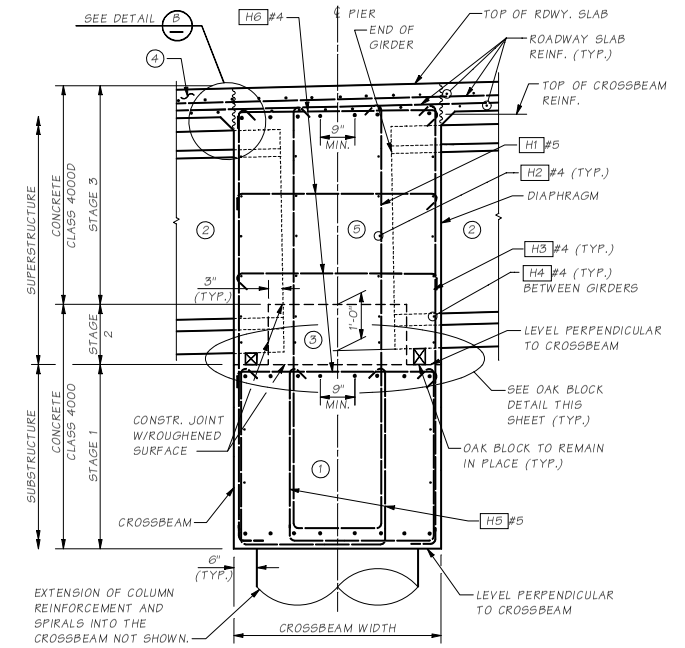
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



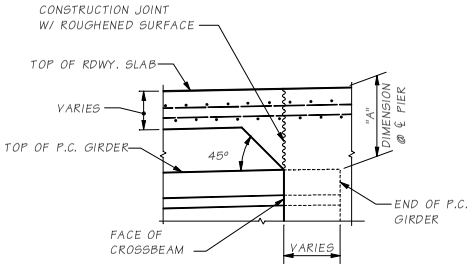
SECTION A

CONSTRUCTION SEQUENCE

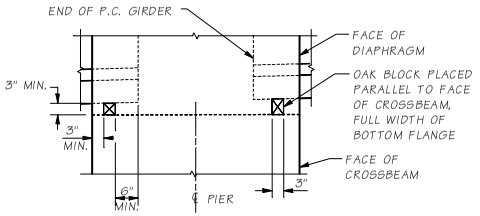
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED FLUSH-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

SR 5.6-A5-6 JOB NO. SHEET

Wed Apr 26 08:06:33 2006

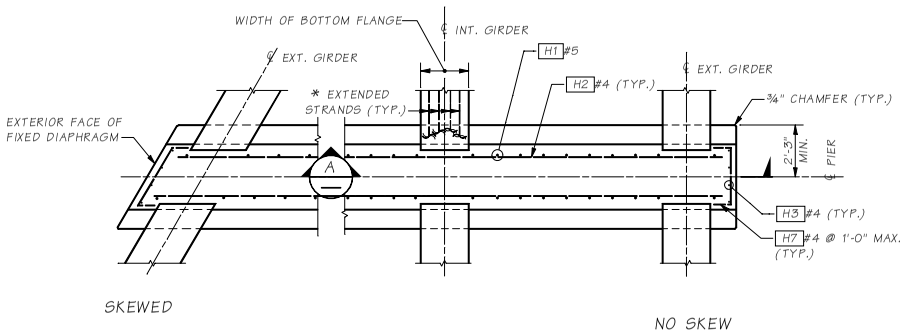
BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

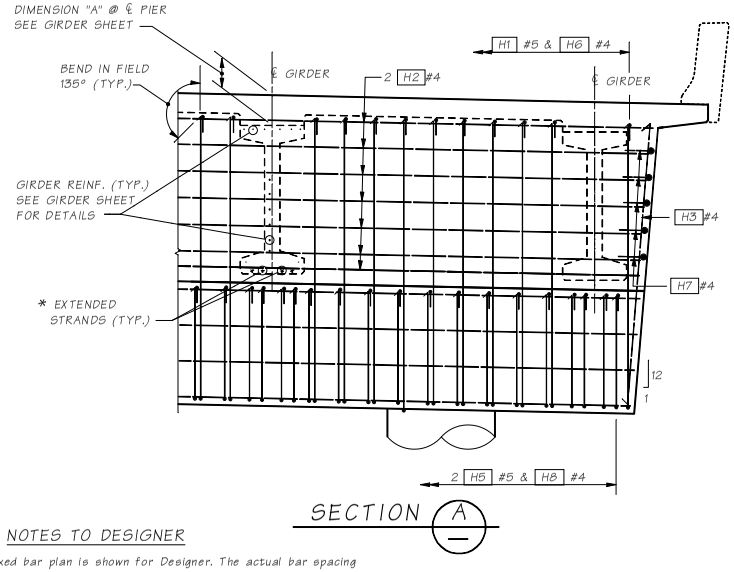
W58G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO. SHEET OF SHEETS



PLAN - FIXED RECESSED-FACE DIAPHRAGM

* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



SECTION A

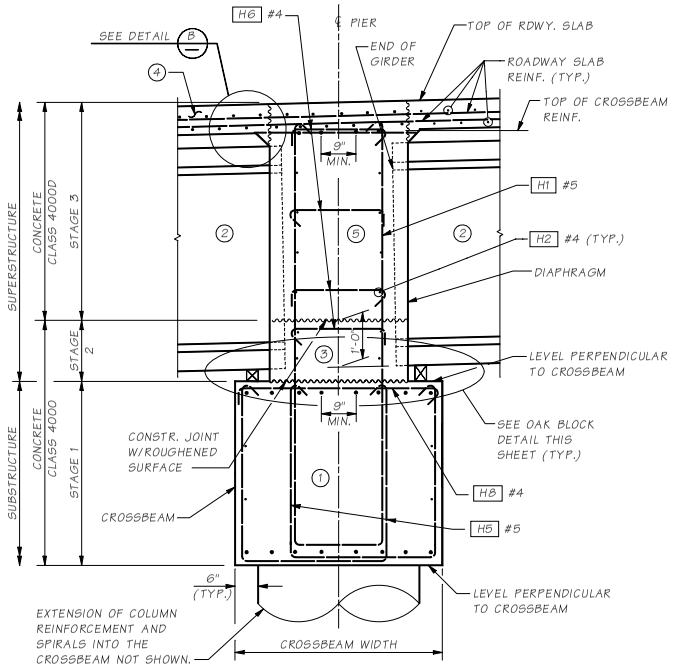
NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

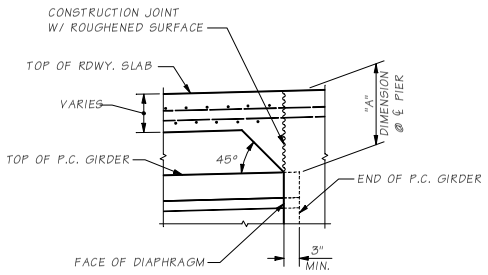
Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

CONSTRUCTION SEQUENCE

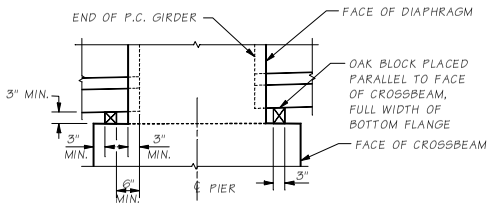
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED RECESSED-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

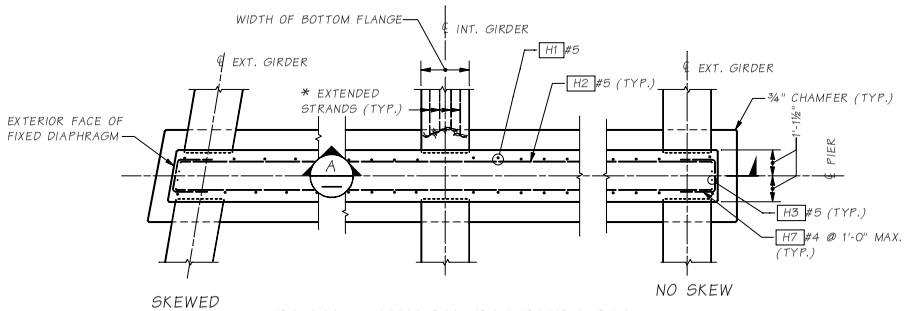
W58G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

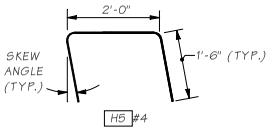
SR JOB NO. SHEET 5.6-A5-7

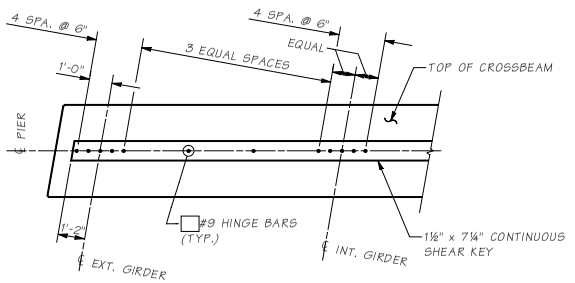
Wed Apr 26 08:06:27 2006



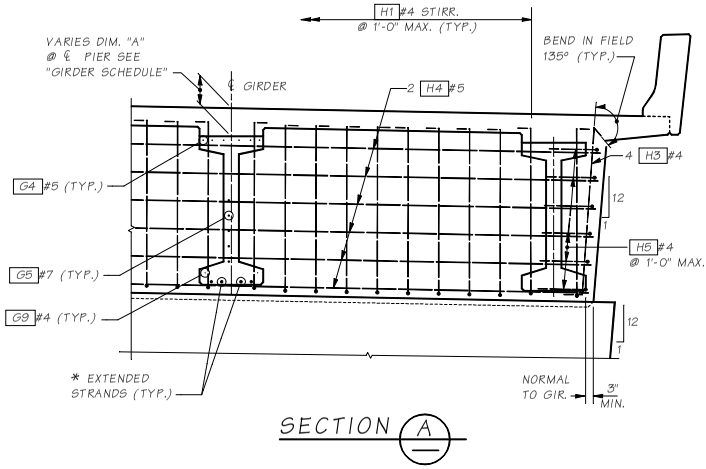
PLAN - HINGE DIAPHRAGM

10° MAX. SKEW FOR HINGE DIAPHRAGM.
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET

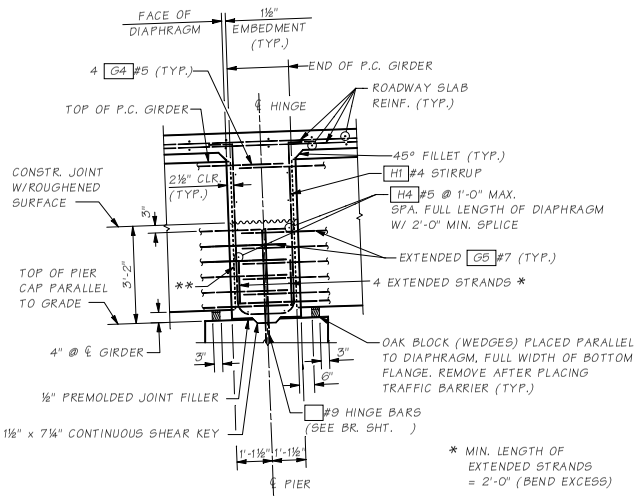




HINGE BAR PLAN

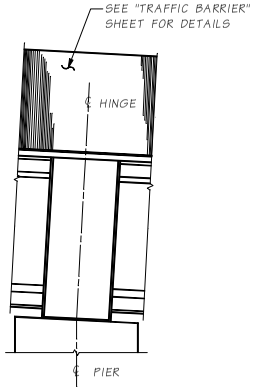


SECTION A



TYPICAL HINGE SECTION

** FOR SAWTOOTH SHEAR KEY DETAILS, SEE GIRDER SHEETS.



TYP. END VIEW HINGE DIAPHRAGM

NOTES TO DESIGNER

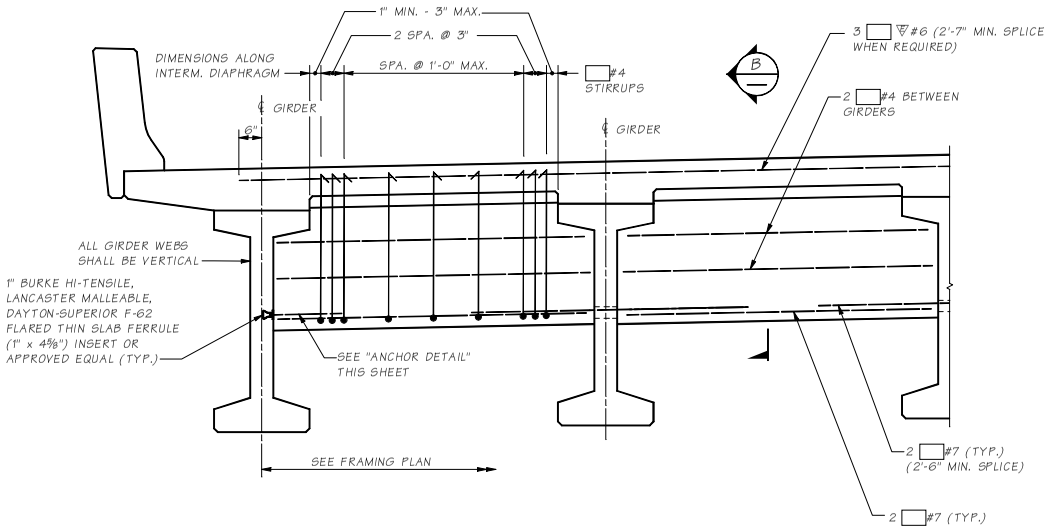
Hinge bar plan is shown for designer. The actual hinge bars shall be located along the ℄ pier on the crossbeam details sheet, for final contract plans. The hinge bars shall be deleted from this sheet prior to the award copy of the contract plans.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by the oak block location.

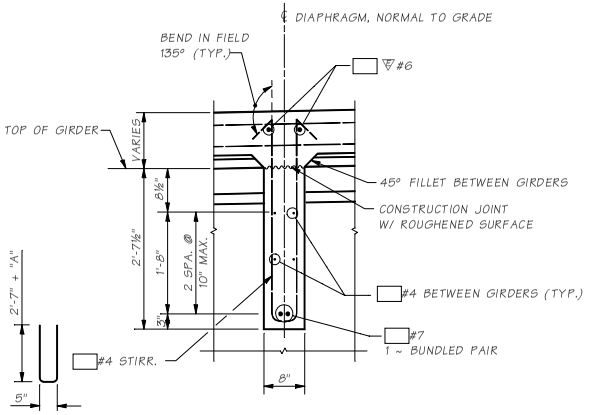
Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_HINGE_DIAPHRAGM_INTER_PIER_DIAPH_DET.MXN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W58G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS
Detailed By										BRIDGE SHEET NO. / SHEET / OF / SHEETS
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

SHEET
JOB NO.
SR
5.6-A5-8

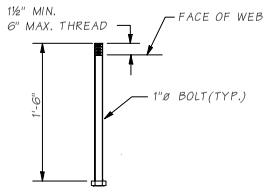
Wed Apr 26 08:06:21 2006



TYPICAL INTERMEDIATE DIAPHRAGM



SECTION B



ANCHOR DETAIL
ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_INTER_DIAPHRAGM_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

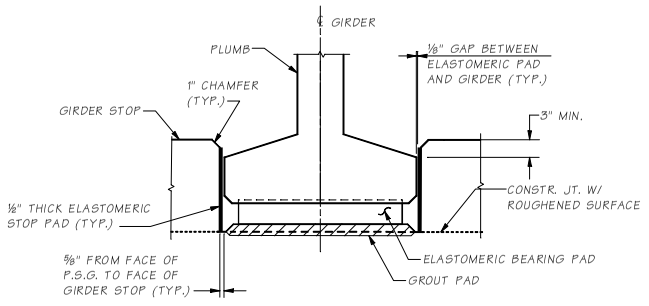
STANDARD PRESTRESSED CONCRETE GIRDERS

W58G INTERMEDIATE DIAPHRAGM DETAILS

BRIDGE SHEET NO. SHEET OF SHEETS

JOB NO. SHEET SR 5.6-A5-9

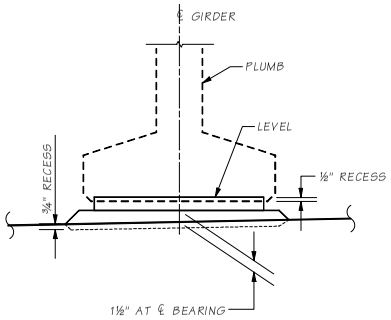
Wed Apr 26 15:15:59 2006



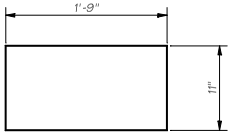
SECTION G

NOTE:

1. GIRDER STOPS SHALL BE CONSTRUCTED AFTER PLACEMENT OF PRESTRESSED GIRDERS.
2. ELASTOMERIC PADS BETWEEN GIRDER AND GIRDER STOPS SHALL BE PLACED AFTER CONSTRUCTING THE GIRDER STOPS. THE PADS SHALL BE COATED WITH APPROVED CEMENTITIOUS ADHESIVE PRIOR TO INSTALLATION.

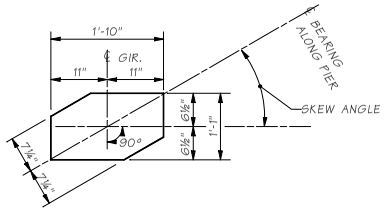


GROUT PAD ELEVATION



ELASTOMERIC STOP PAD

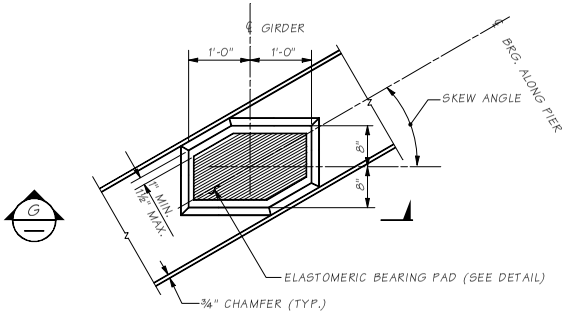
DUROMETER HARDNESS = 60



ELASTOMERIC BEARING PAD

LAMINATED ELASTOMERIC BEARING PAD ☐ THICK (☐ SHIMS)
DUROMETER HARDNESS = 60

(SKEW ANGLE SHOWN @ 30°)



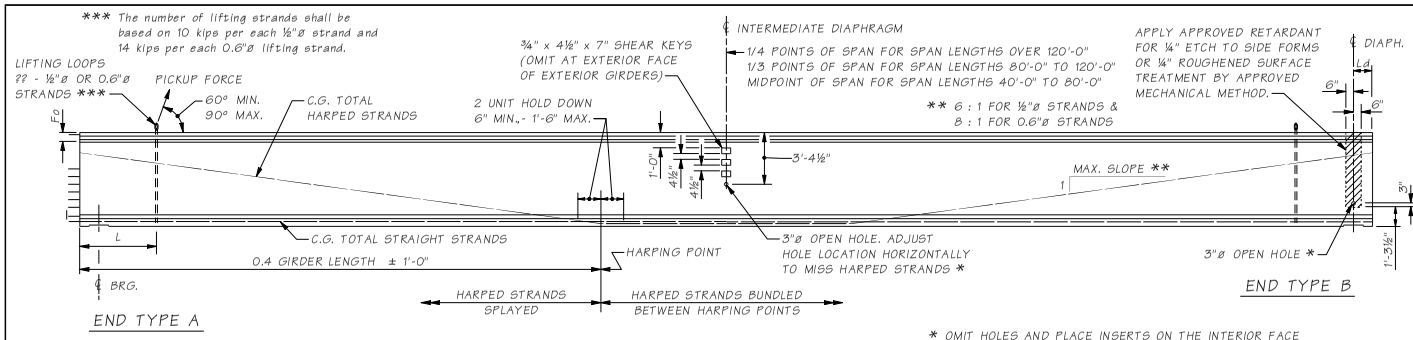
GROUT PAD DETAIL

(SKEW ANGLE SHOWN @ 30°)
(SHOWN FOR END DIAPHRAGM ON GIRDER)

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W58G\W58G_MISC_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W58G MISCELLANEOUS BEARING DETAILS
Detailed By										BRIDGE SHEET NO.
3ridge Projects Engr.										SHEET
Prelim. Plan By										OF
Architect/Specialist	DATE	REVISION	BY	APP'D						SHEETS

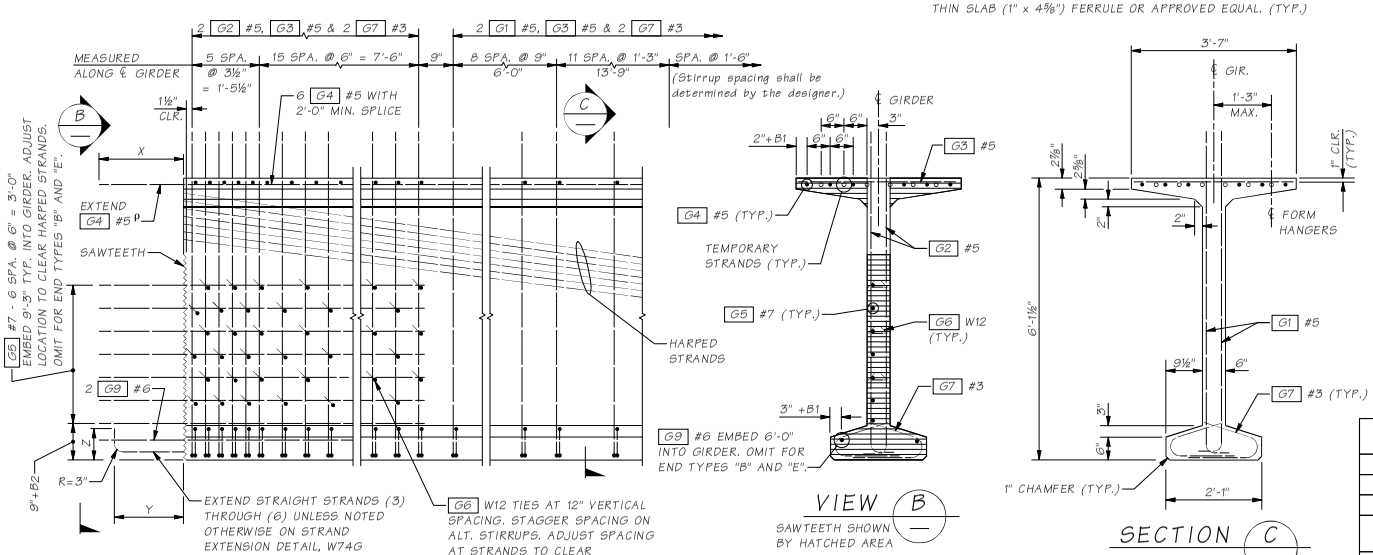
SHEET
JOB NO.
5.6-A5-10
SR

Thu Jan 11 11:51:26 2007



GIRDER ELEVATION

* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)



VIEW B
SAWTEETH SHOWN BY HATCHED AREA

SECTION C

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WUAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE W74G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

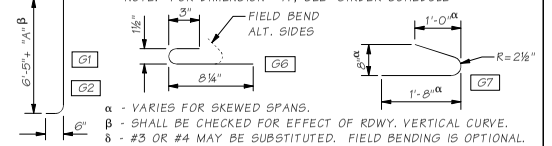
ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.

FOR END TYPE "C"
ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G1.man			REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor				10	WASH.			
Designed By				JOB NUMBER				
Checked By								
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

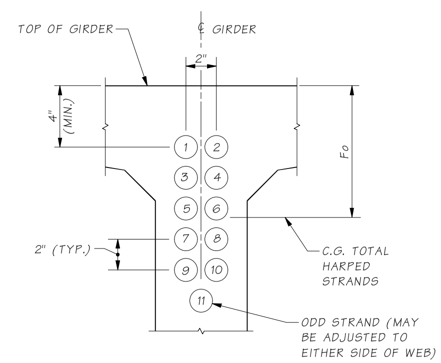
W74G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO.

SHEET OF SHEETS

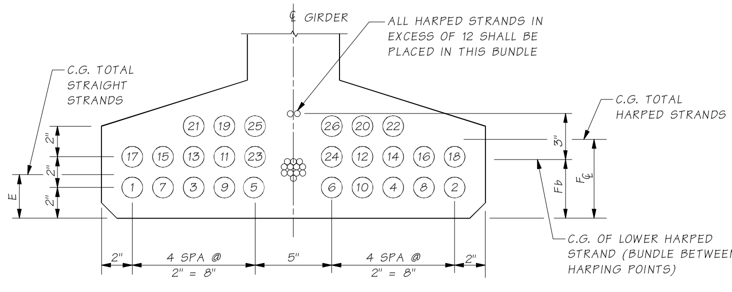
SR ____ SHEET ____ JOB NO. 5.6-A6-1

Fri Jan 26 13:07:56 2007



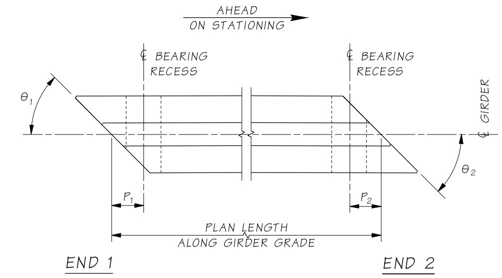
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.

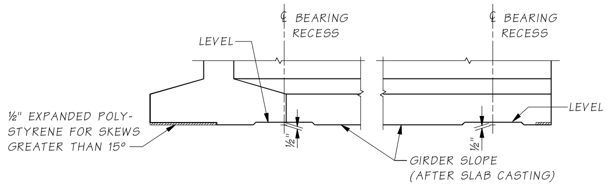


GIRDER SCHEDULE

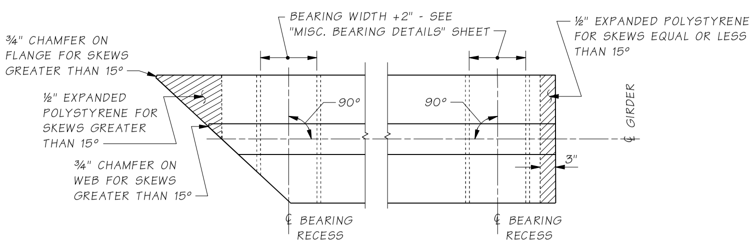
DIMENSION "A" AT ℄ BEARINGS =

BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

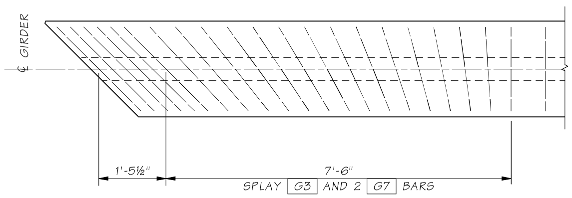
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'CI (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

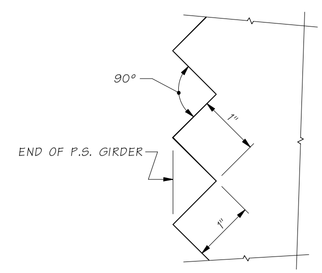


PLAN
BEARING RECESS AND
BOTTOM FLANGE SPALL PROTECTION



TRANSVERSE REINFORCING
SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - W74G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G2.man
Supervisor	
Designed By	
Checked By	
Detailed By	
Bridge Projects Engr.	
Prelim. Plan By	
Architect/Specialist	DATE / REVISION / BY / APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH.			

JOB NUMBER

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

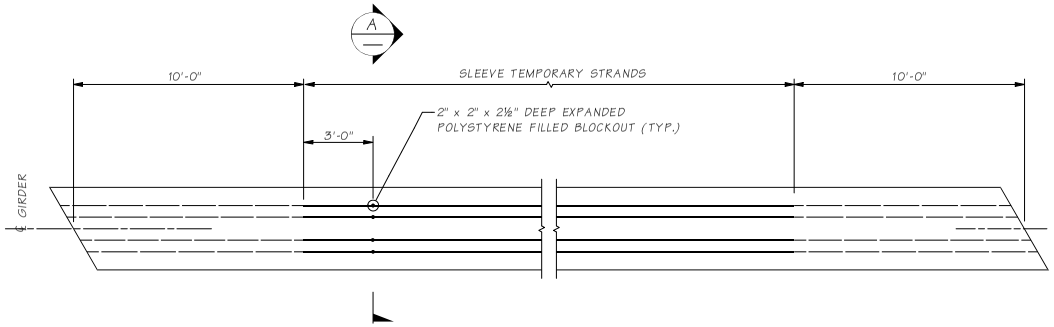
STANDARD PRESTRESSED CONCRETE GIRDERS

W74G GIRDER DETAILS 2 OF 3

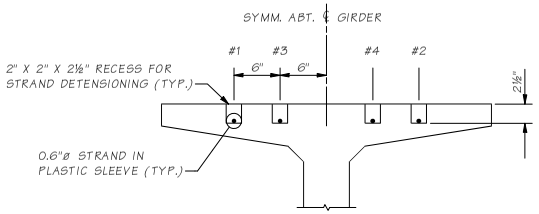
BRIDGE SHEET NO. | SHEET OF SHEETS

Fri Jan 26 13:07:50 2007

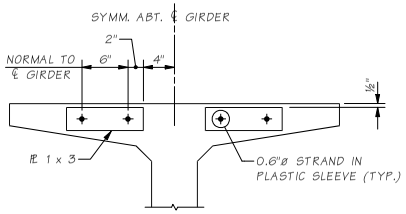
JOB NO. SR SHEET



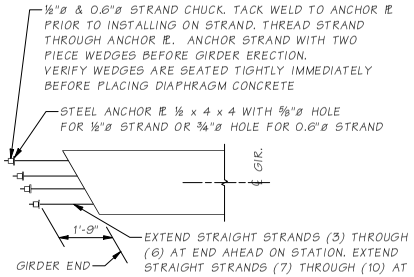
PLAN
TEMPORARY STRANDS



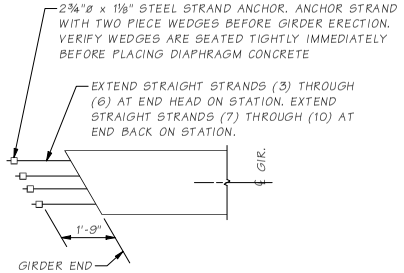
SECTION A



END VIEW
TEMPORARY STRAND
POST-TENSIONED ALTERNATE



ALTERNATE #1



ALTERNATE #2

STRAND EXTENSION DETAIL

n = ? TOTAL NUMBER OF EXTENDED STRANDS

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G3.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W74G GIRDER DETAILS 3 OF 3

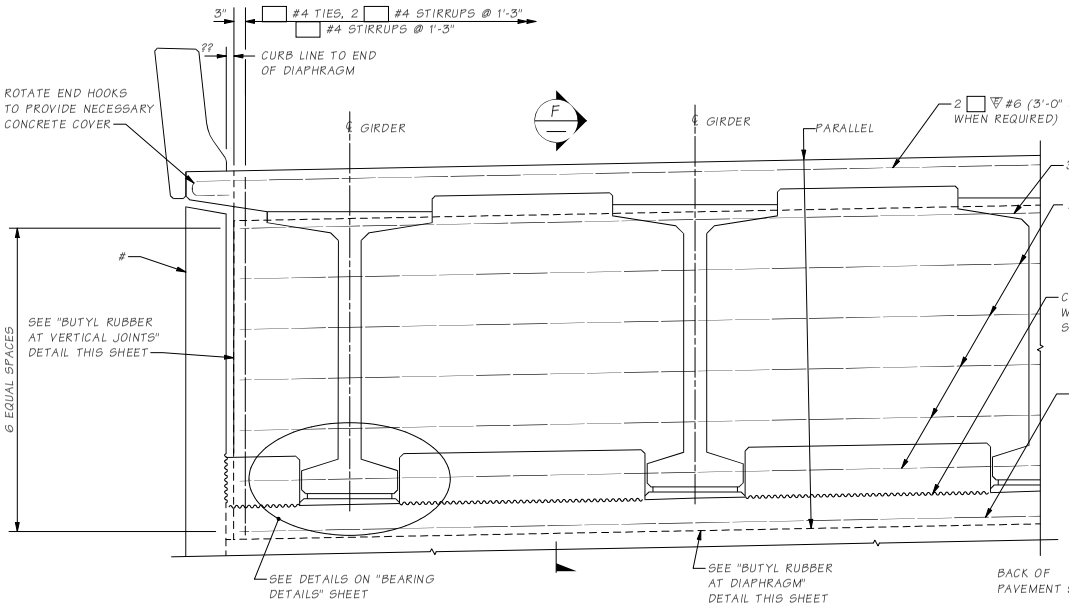
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET 3

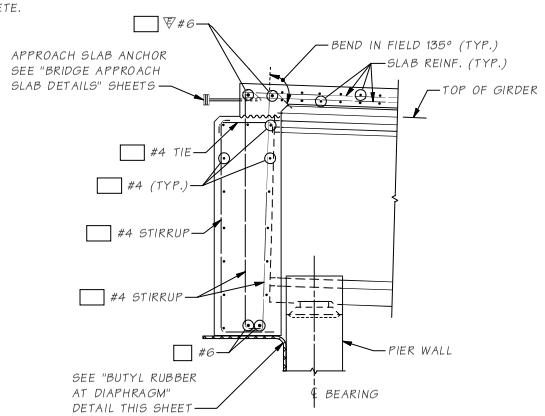
5.6-A6-3

Fri Jan 26 13:07:45 2007



TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



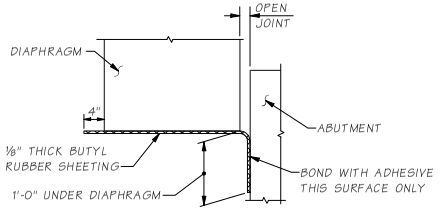
SECTION F

NOTE TO DESIGNER

If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.

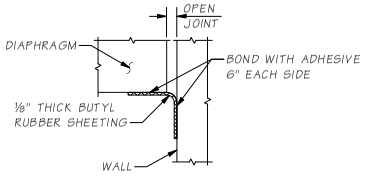
ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ELEVATION BUTYL RUBBER AT DIAPHRAGM

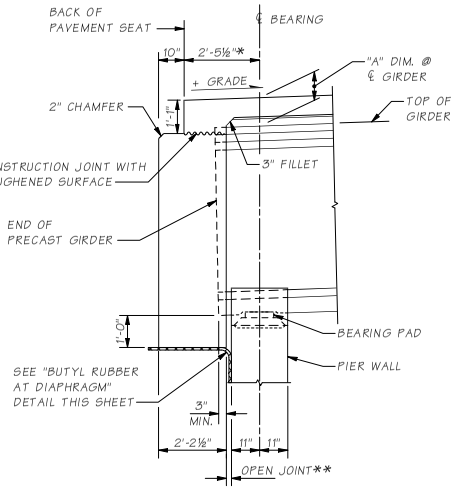
NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.

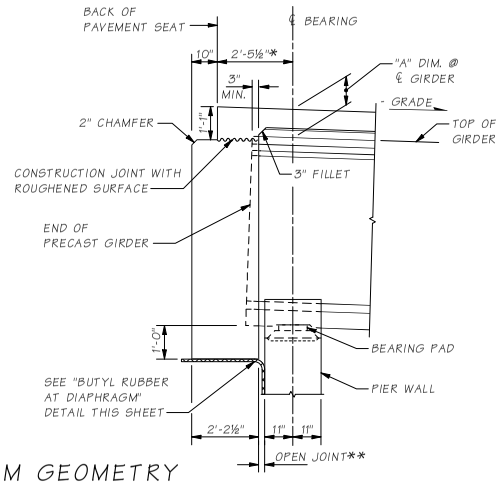


PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint





END DIAPHRAGM GEOMETRY

SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_END_DIA_ON_GIR.MAN			REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor				10	WASH.			
Designed By				JOB NUMBER				
Checked By								
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W74G END DIAPHRAGM ON GIRDER DETAILS

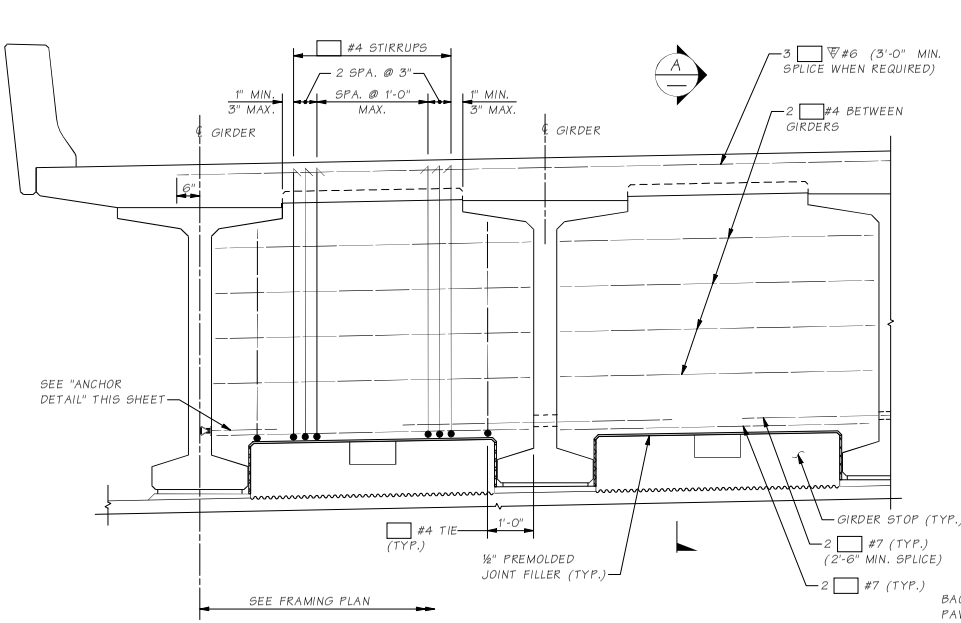
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET ____

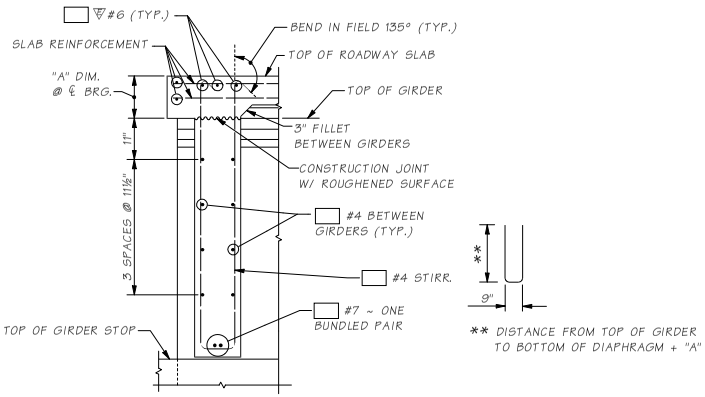
5.6-A6-4

Fri Jan 26 13:07:35 2007

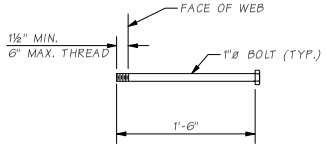


ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM

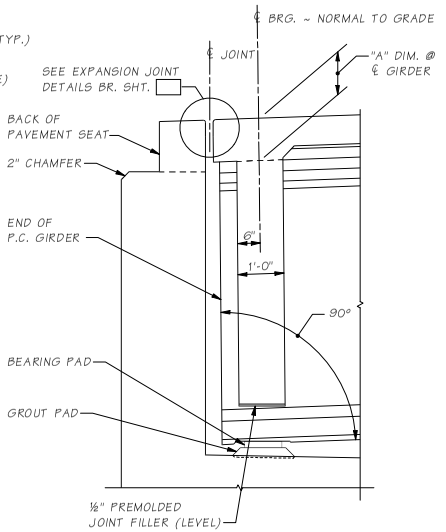


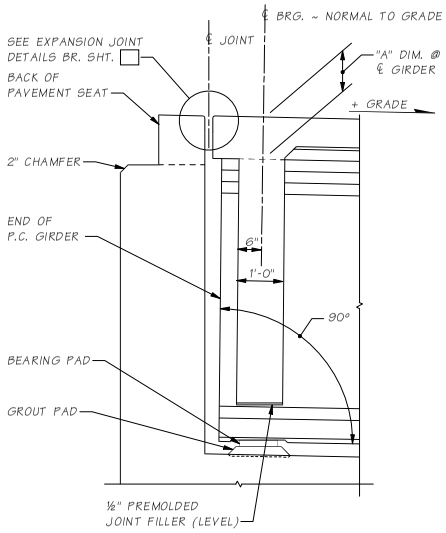
SECTION A



ANCHOR DETAIL

ASTM A-307





ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

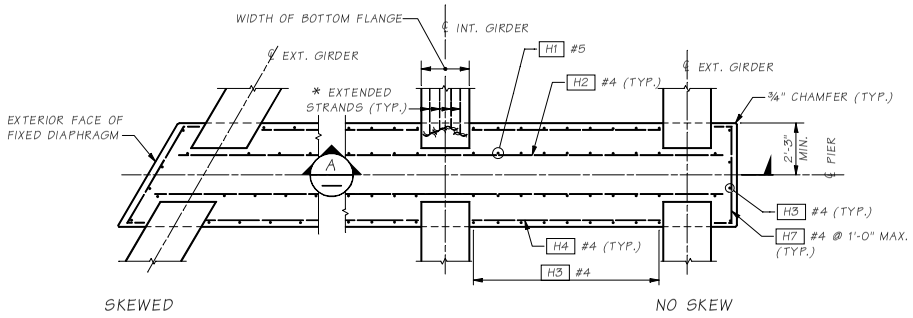
W74G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

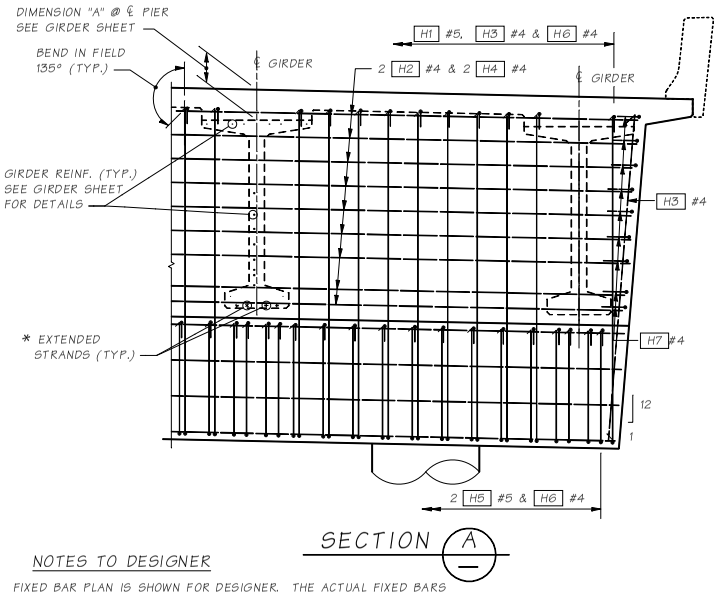
SR JOB NO. SHEET 5.6-A6-5

Fri Jan 26 13:07:40 2007



PLAN - FIXED FLUSH-FACE DIAPHRAGM

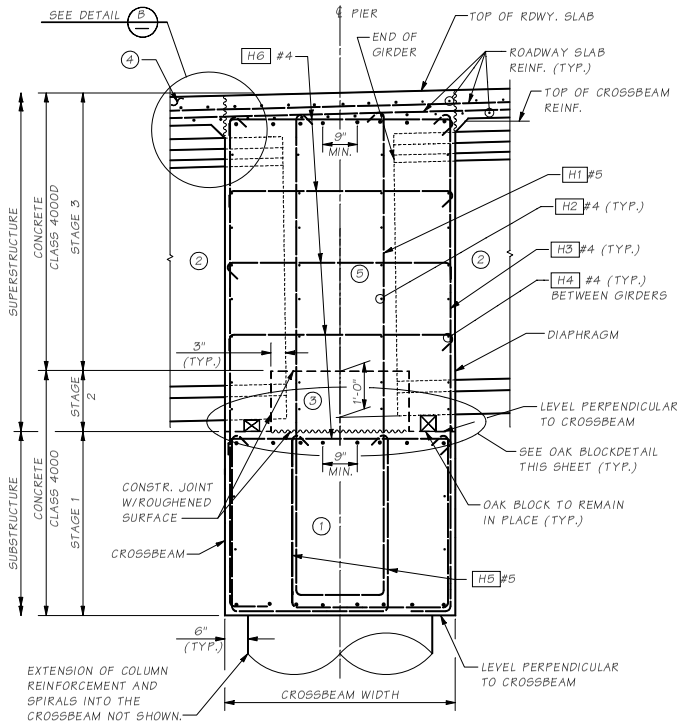
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



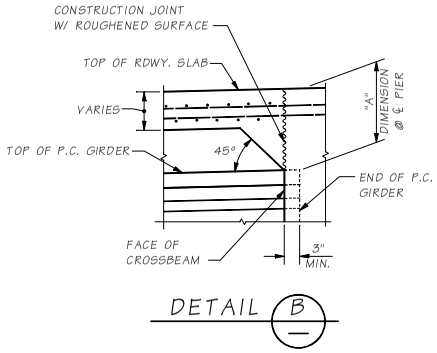
SECTION A

CONSTRUCTION SEQUENCE

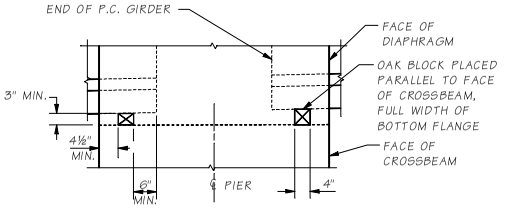
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED FLUSH-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

NOTES TO DESIGNER

FIXED BAR PLAN IS SHOWN FOR DESIGNER. THE ACTUAL FIXED BARS SHALL BE LOCATED ALONG THE ℄ PIER ON THE CROSSBEAM DETAILS SHEET FOR FINAL CONTRACT PLANS.

OAK BLOCK WEDGES SHALL BE SHOWN ON CROSSBEAM PLAN SHEET, PARALLEL TO THE ℄ PIER IF SKEWED. CROSSBEAM WIDTH IS DICTATED BY OAK BLOCK LOCATION.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

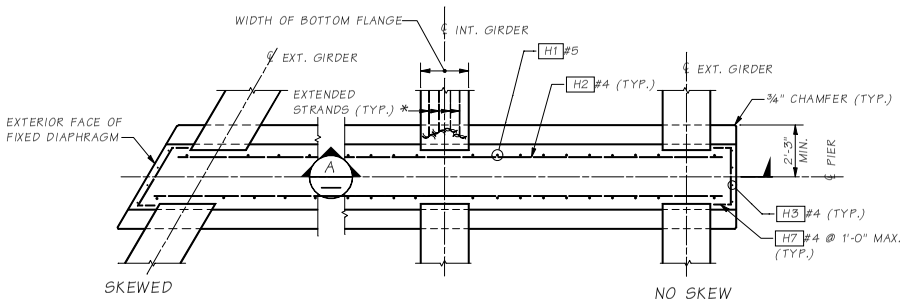
W74G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR | JOB NO. | SHEET

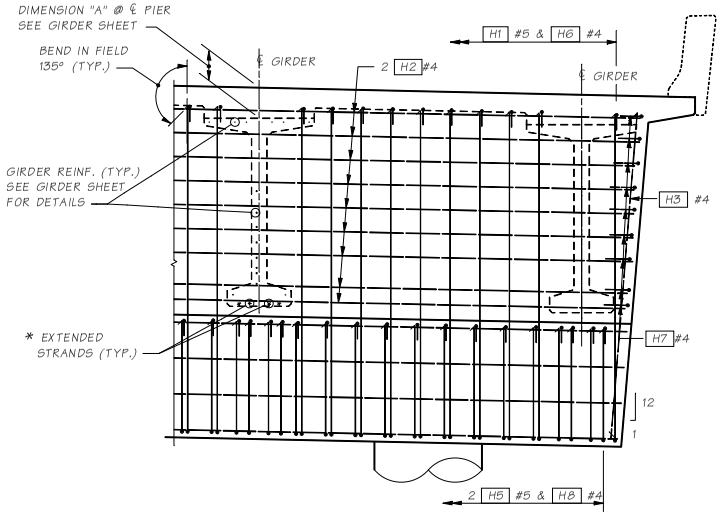
5.6-A6-6

Wed Apr 26 08:07:49 2006



PLAN - FIXED RECESSED-FACE DIAPHRAGM

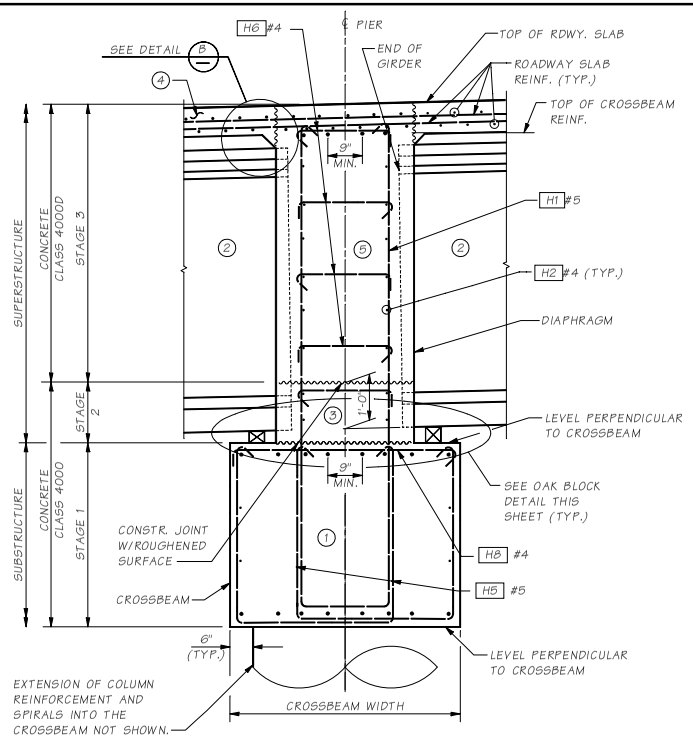
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET



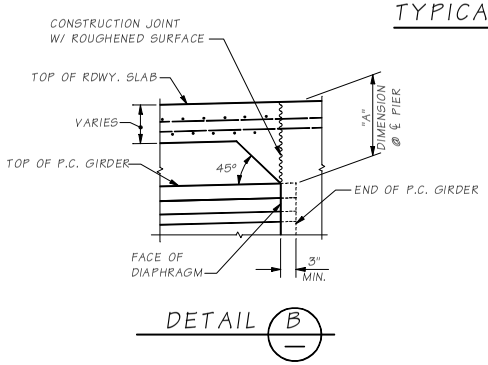
SECTION A

CONSTRUCTION SEQUENCE

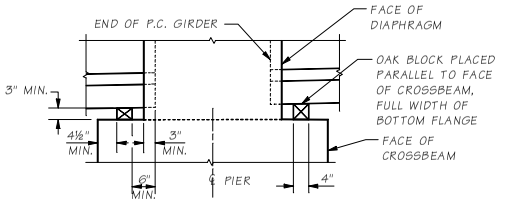
1. CROSSBEAM
2. PLACE GIRDER ON BLOCKS
3. DIAPHRAGM STAGE 2
4. ROADWAY SLAB
5. COMPLETE DIAPHRAGM



TYPICAL FIXED RECESSED-FACE DIAPHRAGM



DETAIL B



OAK BLOCK DETAIL

NOTES TO DESIGNER

Fixed bar plan is shown for Designer. The actual bar spacing shall be determined by the Designer.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by oak block location.

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

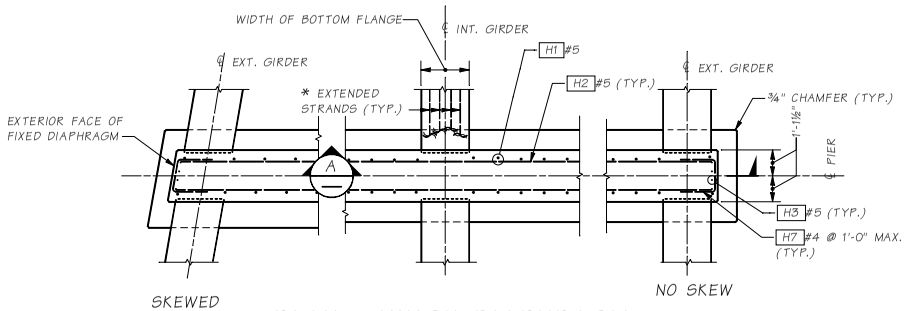
W74G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

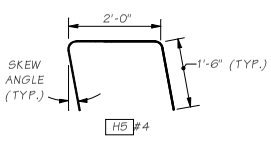
SR JOB NO. SHEET 5.6-A6-7

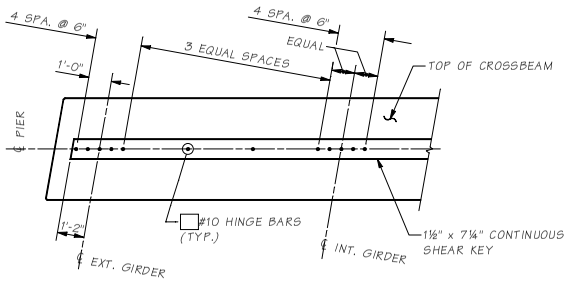
Wed Apr 26 08:07:44 2006



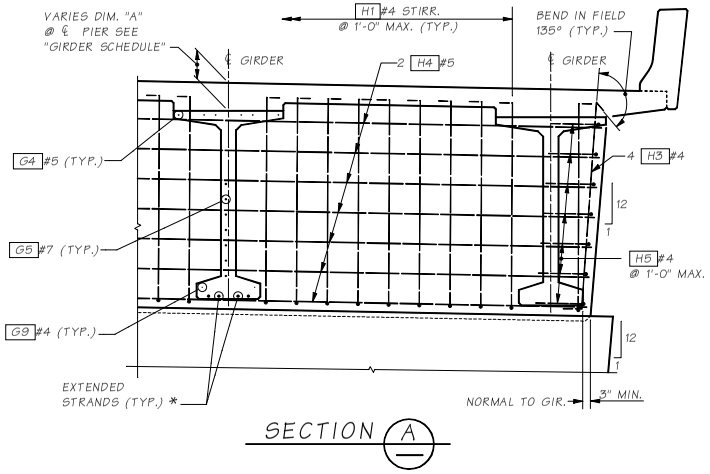
PLAN - HINGE DIAPHRAGM

10° MAX. SKEW FOR HINGE DIAPHRAGM.
* FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET

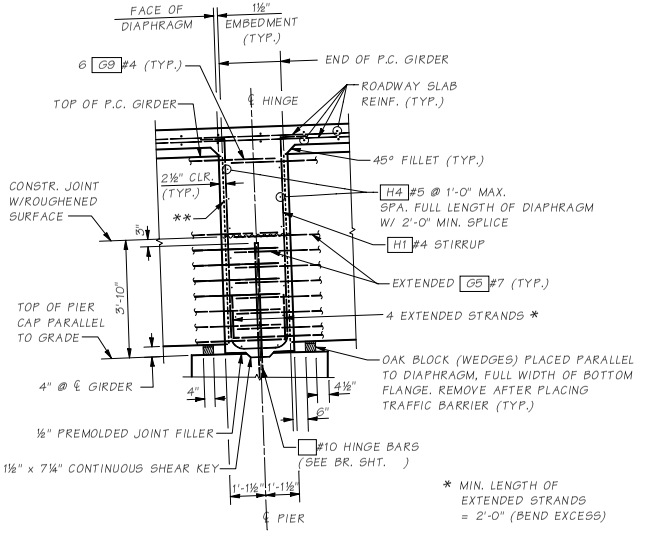




HINGE BAR PLAN

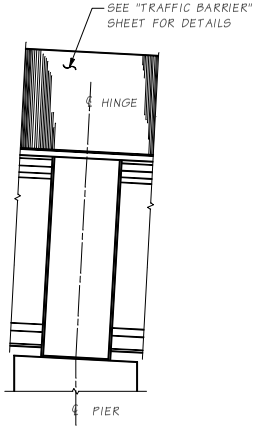


SECTION A



TYPICAL HINGE SECTION

** FOR SAWTOOTH SHEAR KEY DETAILS, SEE GIRDER SHEETS.



TYP. END VIEW HINGE DIAPHRAGM

NOTES TO DESIGNER

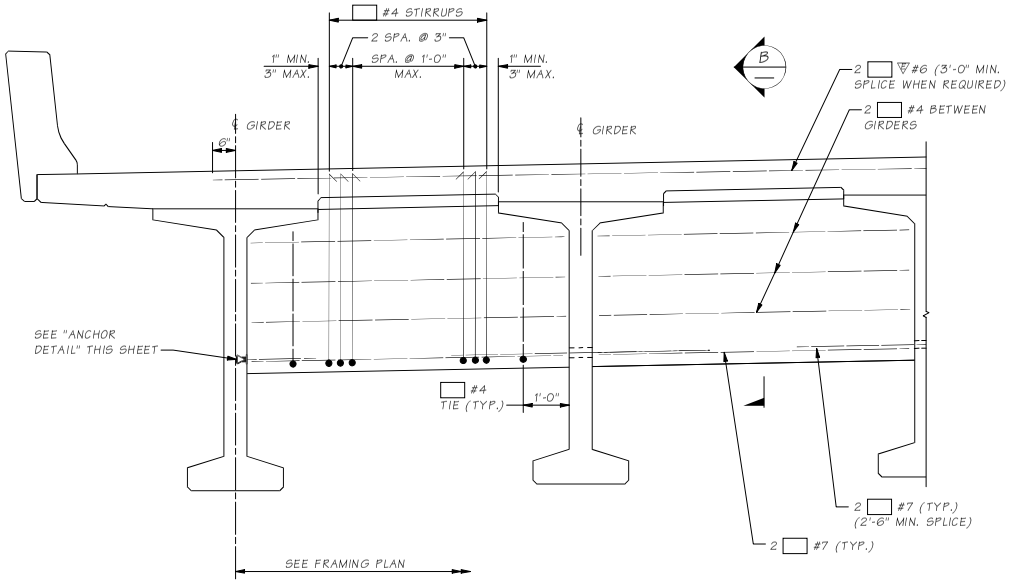
Hinge bar plan is shown for designer. The actual hinge bars shall be located along the ℄ pier on the crossbeam details sheet, for final contract plans. The hinge bars shall be deleted from this sheet prior to the award copy of the contract plans.

Oak block wedges shall be shown on crossbeam plan sheet, parallel to the ℄ pier if skewed. Crossbeam width is dictated by the oak block location.

SHEET
JOB NO.
SR.
5.6-A6-8

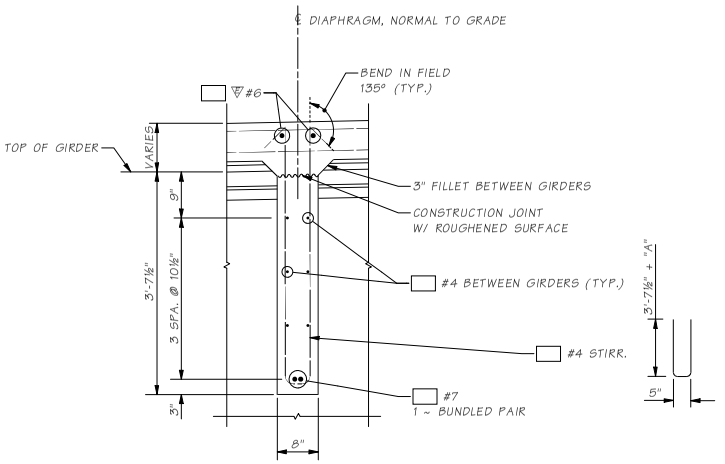
Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_HINGE_DIAPHRAGM_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W74G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS
Detailed By										BRIDGE SHEET NO. / SHEET / OF / SHEETS
Bridge Projects Engr.										
Prelim Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

Wed Apr 26 08:07:39 2006

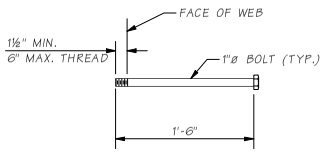


ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION B



ANCHOR DETAIL

ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

W74G INTERMEDIATE DIAPHRAGM DETAILS

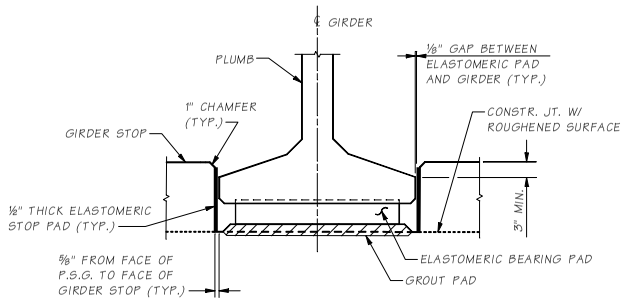
BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

5.6-A6-9

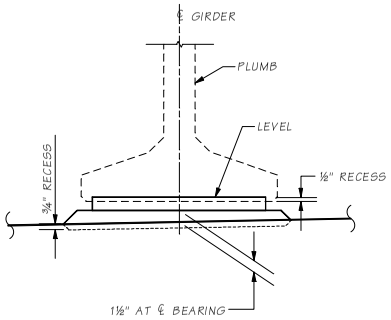
Fri Jan 26 13:08:02 2007



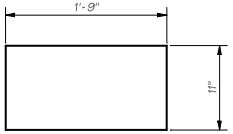
SECTION G

NOTE:

1. GIRDER STOPS SHALL BE CONSTRUCTED AFTER PLACEMENT OF PRESTRESSED GIRDERS.
2. ELASTOMERIC PADS BETWEEN GIRDER AND GIRDER STOPS SHALL BE PLACED AFTER CONSTRUCTING THE GIRDER STOPS. THE PADS SHALL BE COATED WITH APPROVED CEMENTITIOUS ADHESIVE PRIOR TO INSTALLATION.

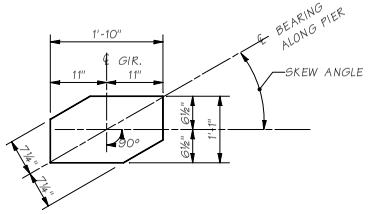


GROUT PAD ELEVATION



ELASTOMERIC STOP PAD

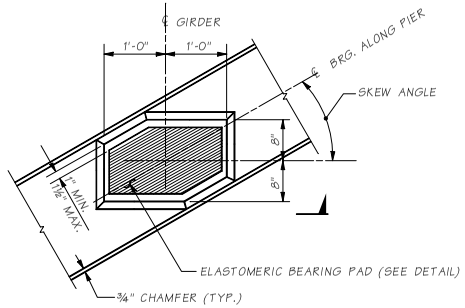
DUROMETER HARDNESS = 60



ELASTOMERIC BEARING PAD

LAMINATED ELASTOMERIC BRIDGE PAD ☐ THICK (☐ SHIMS)
DUROMETER HARDNESS = 60

(SKEW ANGLE SHOWN @ 30°)



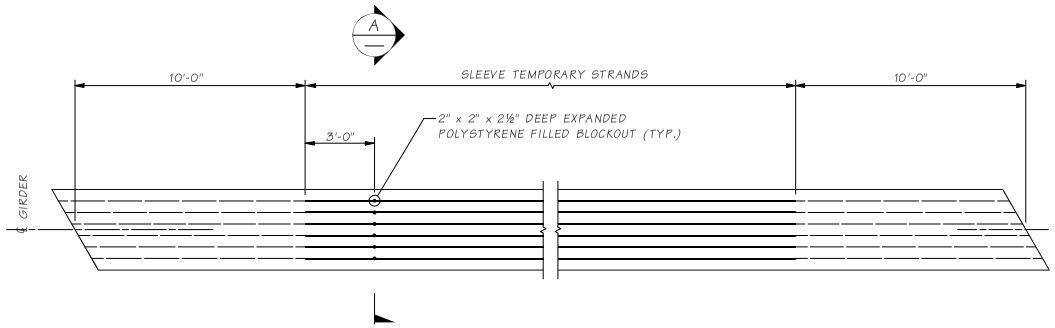
GROUT PAD DETAIL

(SKEW ANGLE SHOWN @ 30°)
(SHOWN FOR END DIAPHRAGM ON GIRDER)

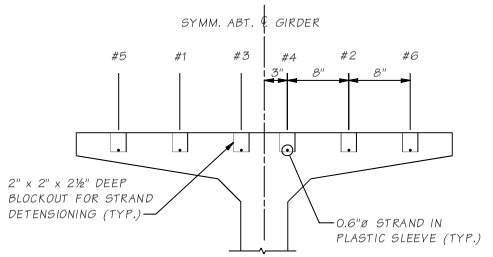
Bridge Design Engr.	M:\STANDARDS\Girders\I-Girders\W74G\W74G_MISC_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										W74G MISCELLANEOUS BEARING DETAILS
Detailed By										BRIDGE SHEET NO.
3ridge Projects Engr.										SHEET OF SHEETS
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

SHEET
JOB NO.
SR
5.6-A6-10

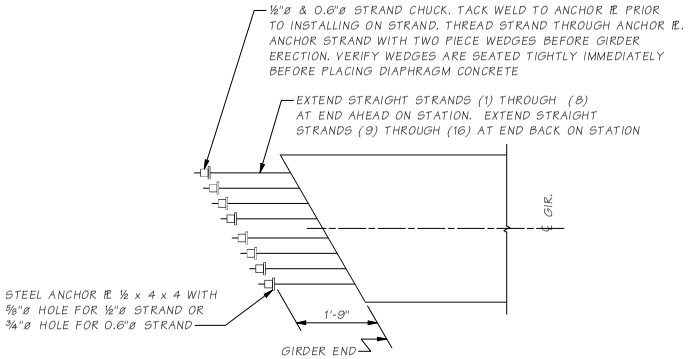
Thu Jan 11 11:51:37 2007



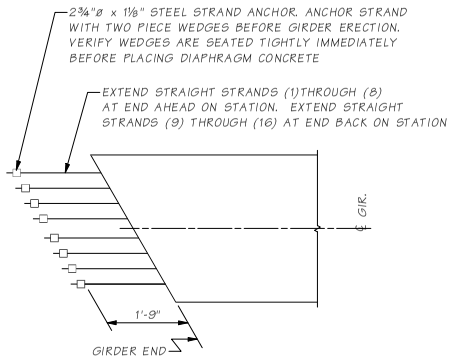
PLAN
TEMPORARY STRANDS



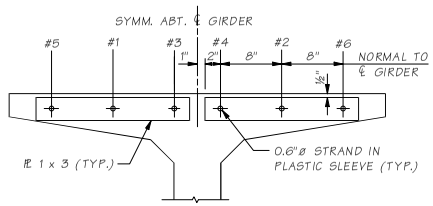
SECTION A



ALTERNATE #1



ALTERNATE #2



END VIEW
TEMPORARY STRAND
POST-TENSIONED ALTERNATE

STRAND EXTENSION DETAIL

n = ? TOTAL NUMBER OF EXTENDED STRANDS

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF Details\GIRDER DETAILS 3 OF 3.MAN									
Supervisor						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By						10	WASH.			
Checked By						JOB NUMBER				
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION		BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

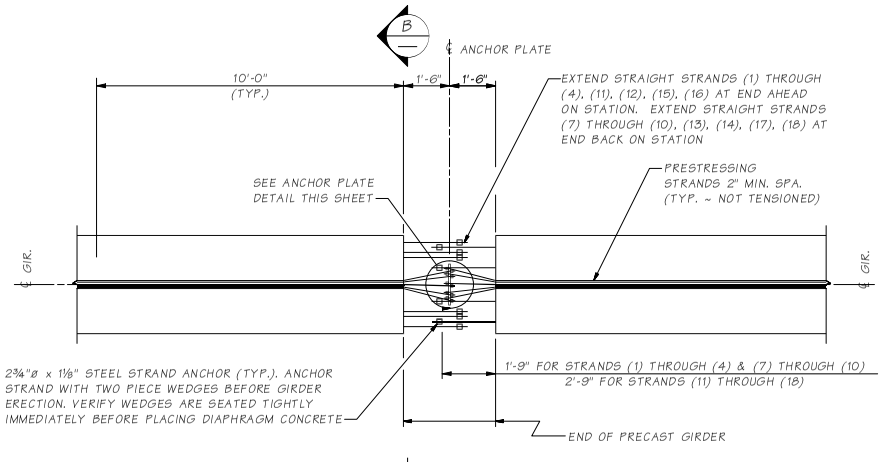
GIRDER DETAILS 3 OF 3

BRIDGE SHEET NO.

SHEET OF SHEETS

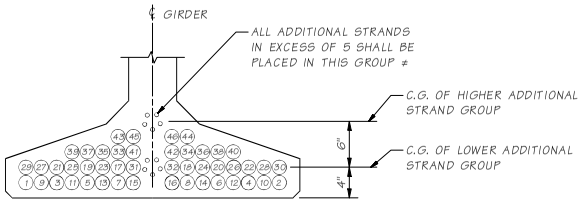
SR ____ SHEET ____ JOB NO. 5.6-A7-1

Thu Feb 15 13:22:55 2007



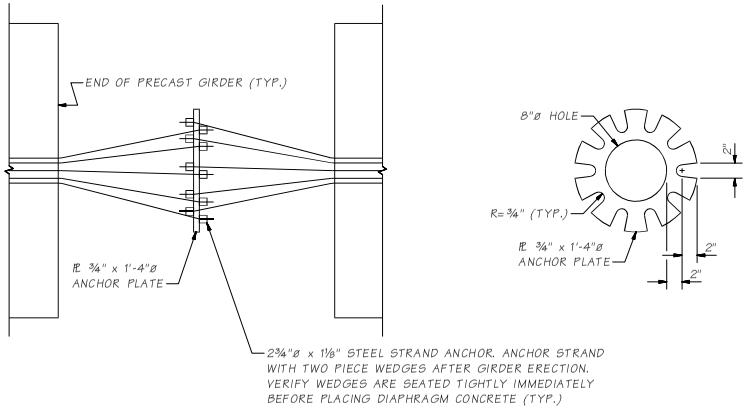
STRAND EXTENSION DETAIL

n = ? TOTAL NUMBER OF EXTENDED STRANDS



VIEW B

\# The number of strands shall be determined by the designer.



ANCHOR PLATE DETAIL

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF Details\ADDITIONAL STRANDS.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH.				
Designed By					JOB NUMBER					
Checked By										
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

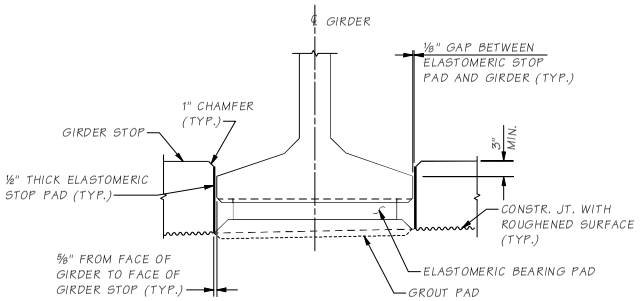
ADDITIONAL EXTENDED STRANDS

BRIDGE SHEET NO. SHEET OF SHEETS

JOB NO. SHEET

5.6-A7-2

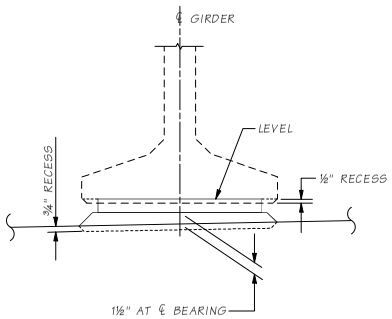
Thu Feb 15 13:23:00 2007



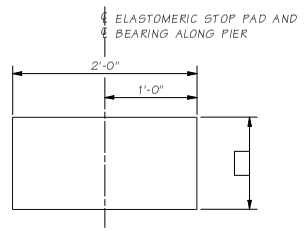
SECTION G

NOTE:

1. GIRDER STOPS SHALL BE CONSTRUCTED AFTER GIRDER PLACEMENT.
2. THE ELASTOMERIC STOP PADS SHALL BE CEMENTED TO GIRDER STOPS WITH APPROVED ADHESIVE.

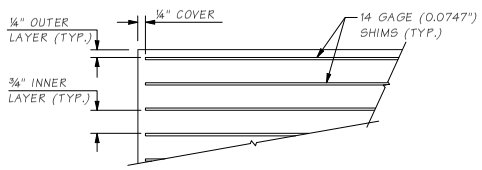


GROUT PAD ELEVATION

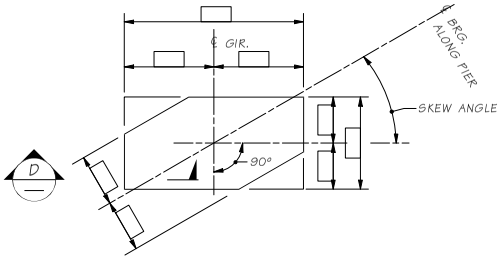


ELASTOMERIC STOP PAD

DUROMETER HARDNESS = 60

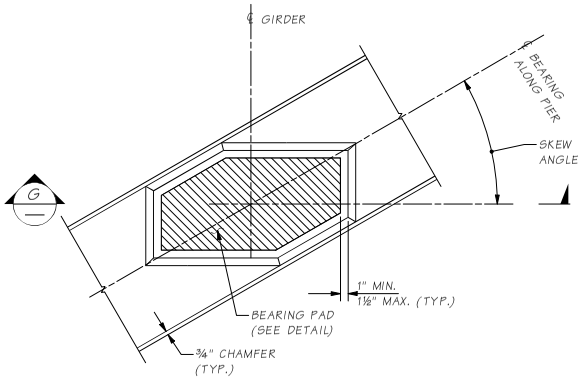


SECTION D



BEARING PAD

LAMINATED ELASTOMERIC BRIDGE PAD ☐ THICK (☐ SHIMS)
(SKEW ANGLE SHOWN @ 30°)



GROUT PAD DETAIL

SKEW ANGLE SHOWN AT 30°

BEARING DESIGN TABLE	
SERVICE - I LIMIT STATE	
DEAD LOAD REACTION	KIPS
LIVE LOAD REACTION (W/O IMPACT)	KIPS
UNLOADED HEIGHT	IN.
LOADED HEIGHT (DL)	IN.
DUROMETER HARDNESS	60

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF Details\MISC_BEARING_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

MISCELLANEOUS BEARING DETAILS

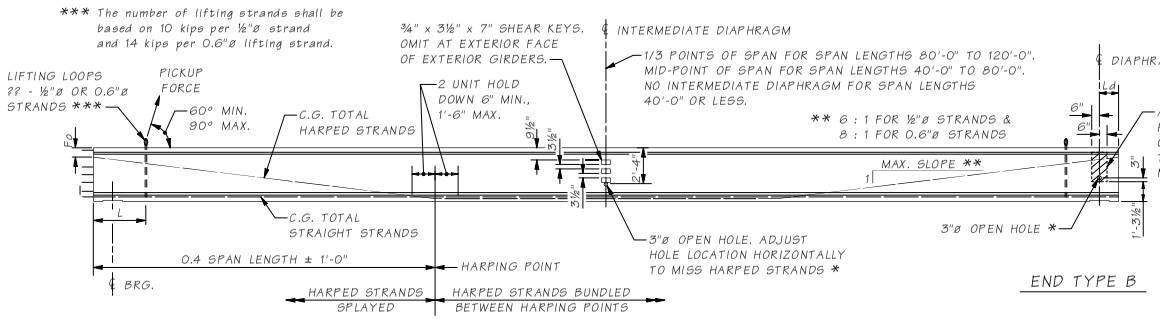
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET

5.6-A7-3

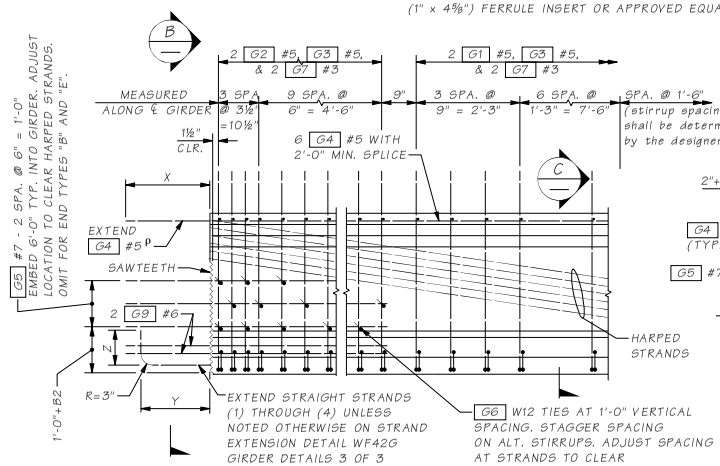
Thu Feb 15 13:23:05 2007



END TYPE A — END TYPE B

GIRDER ELEVATION

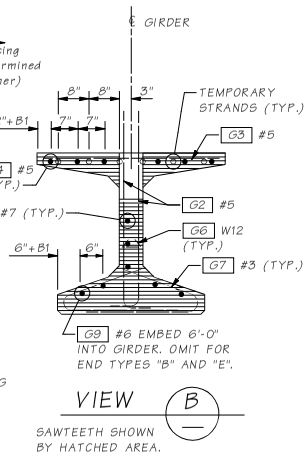
* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE INSERT OR APPROVED EQUAL. (TYP.)



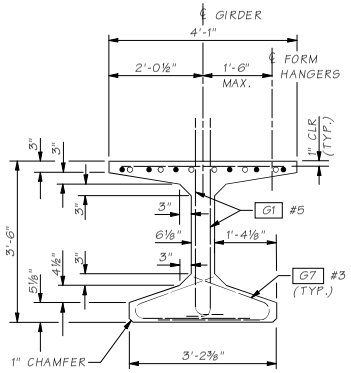
TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B — SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

NOTES:

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WRAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. EXTRA CAUTION MUST BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE WF42G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

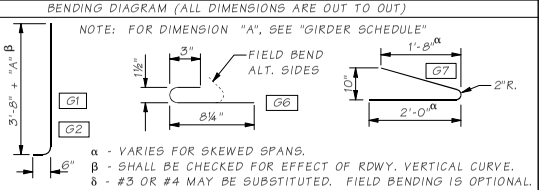
Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF42G\WF42G1.man								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

Thu Feb 15 13:21:38 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

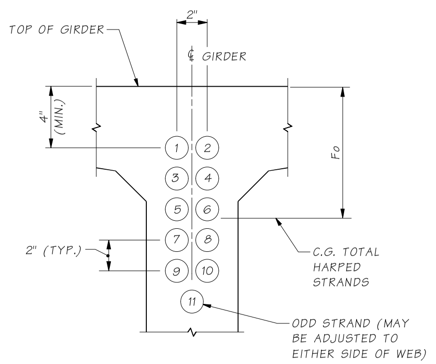
STANDARD PRESTRESSED CONCRETE GIRDERS

WF42G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO. — SHEET — OF — SHEETS

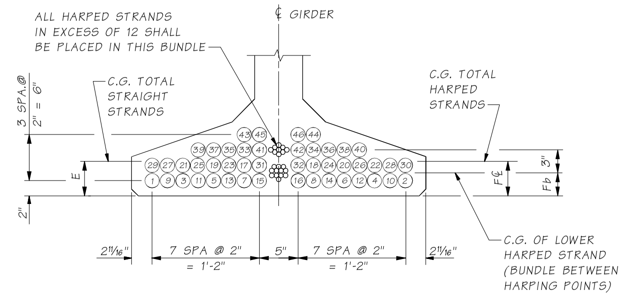
SR — JOB NO. — SHEET

5.6-A7-4



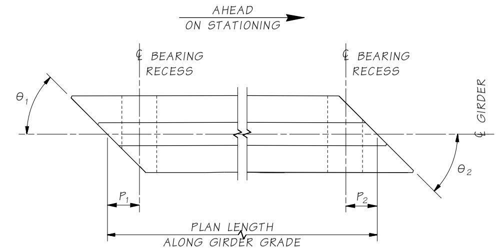
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



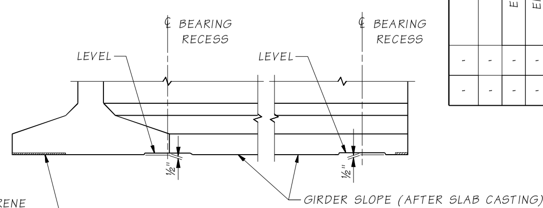
STRAND PATTERN AT ℄ SPAN

STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.

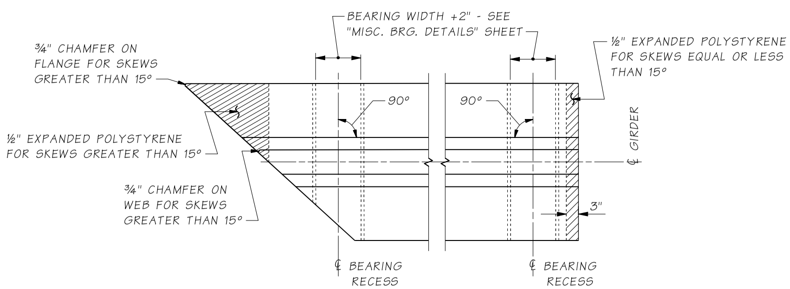


GIRDER SCHEDULE

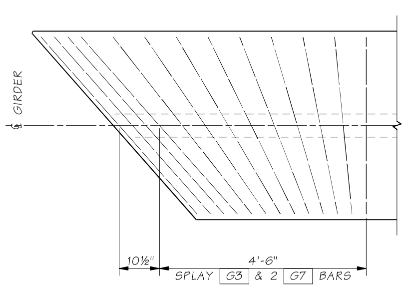
DIMENSION "A" AT ℄ BEARINGS =										BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)																	
										MIN. CONC. COMP. STRENGTH		HARPED		STRAIGHT		TEMPORARY		LOCATION OF C.G. STRANDS (IN.)							
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ_1	θ_2	P_1	P_2	PLAN LENGTH (ALONG GIRDER GRADE)	@ FINAL F'C (KSI)	@ RELEASE F'CI (KSI)	NO. OF STRANDS	JACKING FORCE (KIPS)	NO. OF STRANDS	JACKING FORCE (KIPS)	NO. OF STRANDS	JACKING FORCE (KIPS)	E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

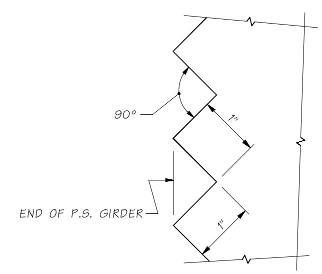


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF42G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF42G\WF42G2.man			
Supervisor				
Designed By				
Checked By				
Detailed By				
Bridge Projects Engr.				
Prelim. Plan By				
Architect/Specialist	DATE	REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH.			
JOB NUMBER				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

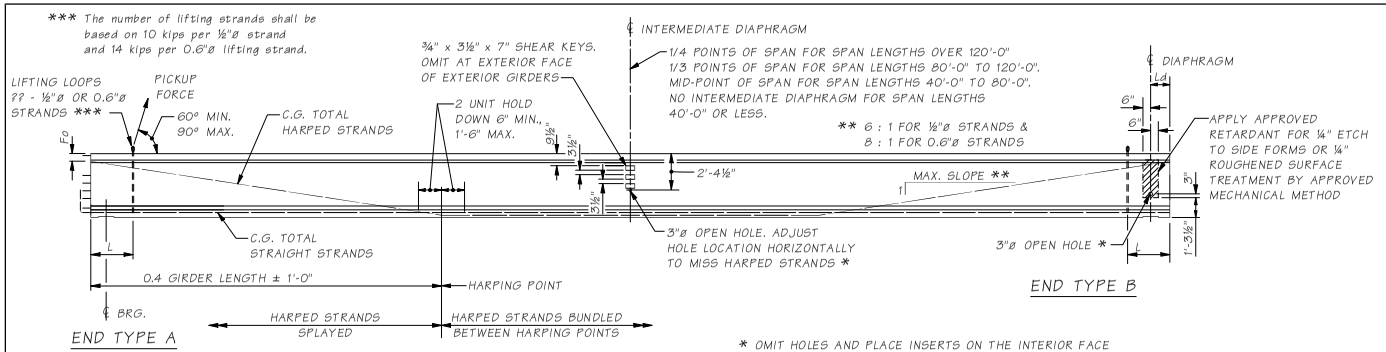
STANDARD PRESTRESSED CONCRETE GIRDERS

WF42G GIRDER
DETAILS 2 OF 3

BRIDGE SHEET NO.
SHEET ___ OF ___ SHEETS

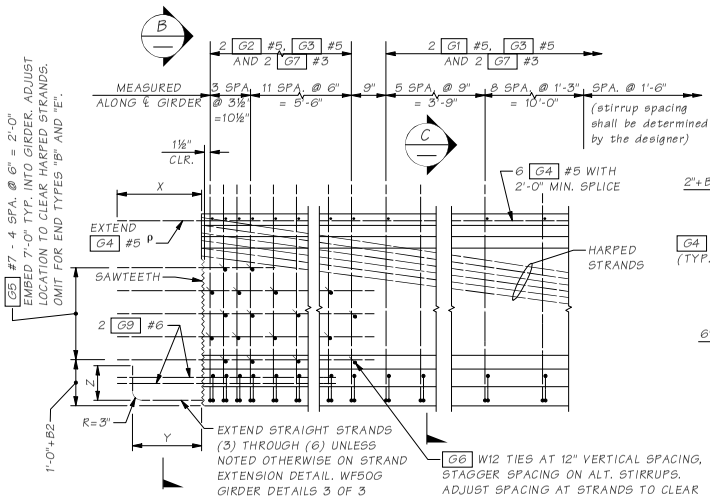
Thu Feb 15 13:21:43 2007

SR ___ JOB NO. ___ SHEET ___



GIRDER ELEVATION

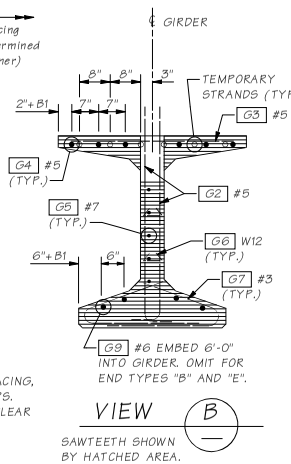
* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)



TYPICAL END ELEVATION

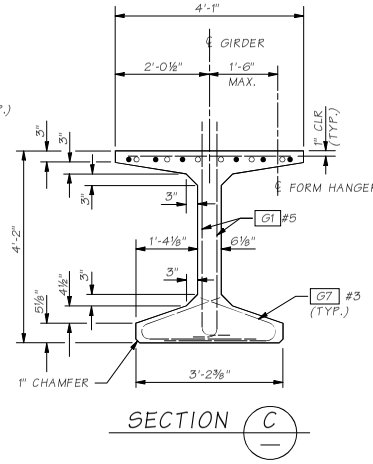
END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B

SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

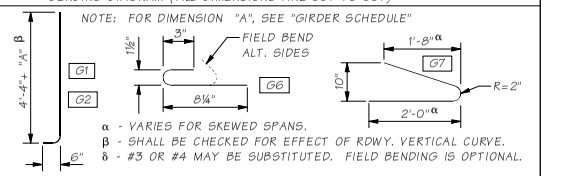
Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)



NOTES:

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WRAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE WF50G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF50G\WF50G1.man					
Supervisor						
Designed By						
Checked By						
Detailed By						
Bridge Projects Engr.						
Prelim. Plan By						
Architect/Specialist	DATE	REVISION	BY	APPD		

REGION NO. 10 | STATE WASH. | JOB NUMBER | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

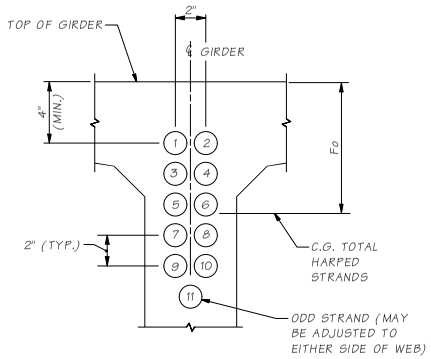
WF50G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR ____ JOB NO. ____ SHEET ____

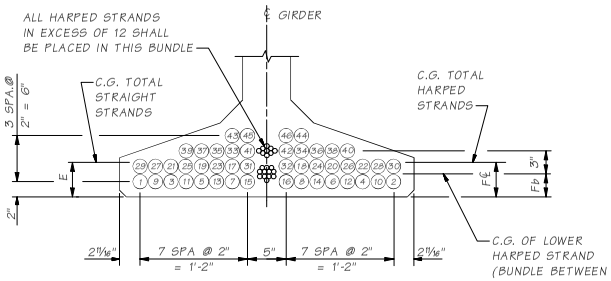
5.6-A8-1

Thu Feb 15 13:21:49 2007



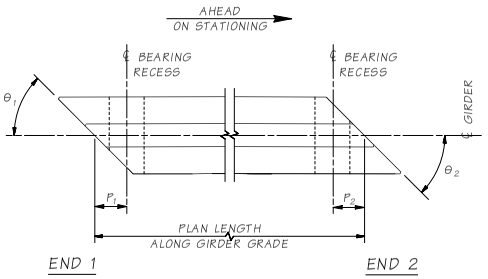
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

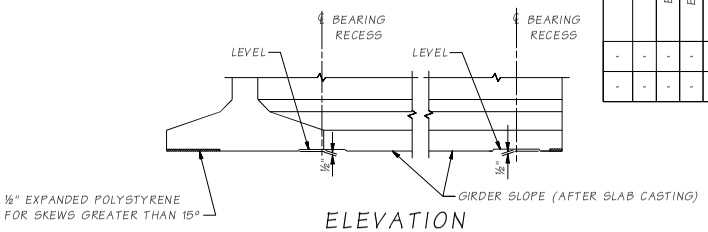
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



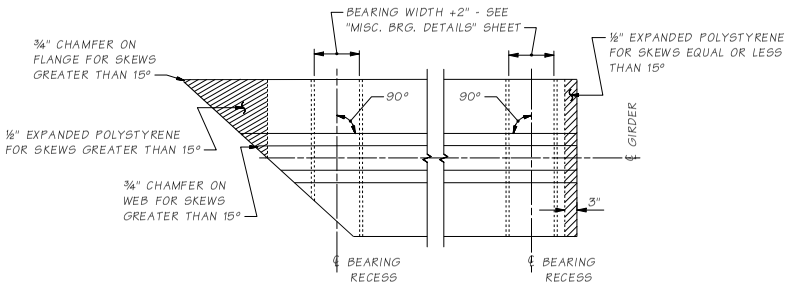
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

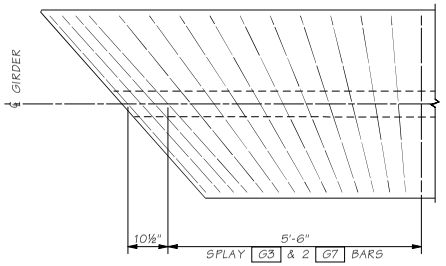
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'CI (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

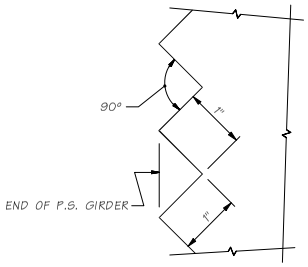


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF50G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF50G\WF50G2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Feb 15 13:21:55 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

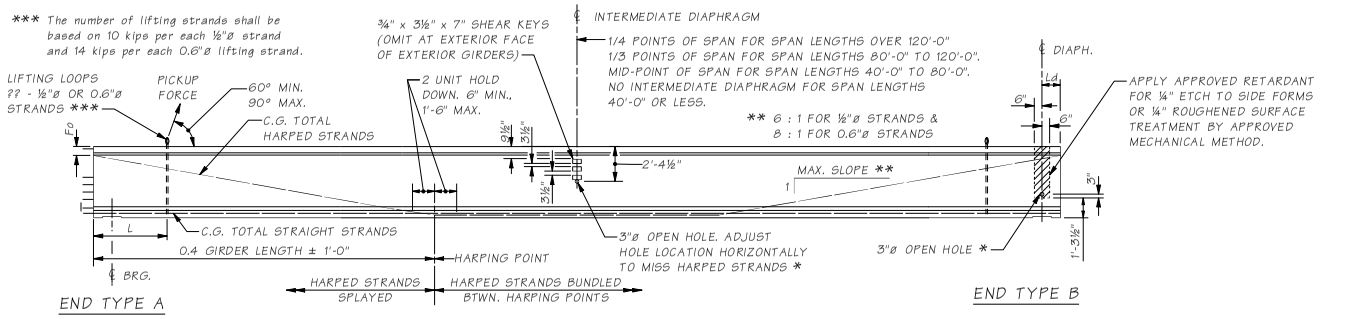
STANDARD PRESTRESSED CONCRETE GIRDER

WF50G GIRDER DETAILS 2 OF 3

BRIDGE SHEET NO. SHEET OF SHEETS

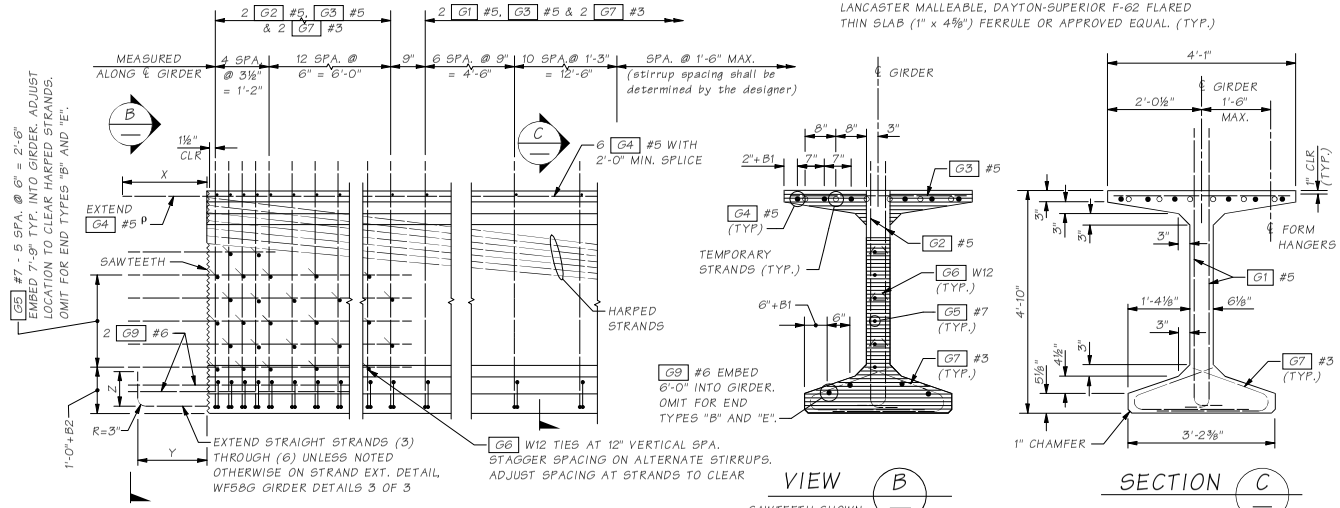
JOB NO. SHEET

SR 5.6-A8-2



GIRDER ELEVATION

* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE OR APPROVED EQUAL. (TYP.)



VIEW B

SAWTEETH SHOWN BY HATCHED AREA.

SECTION C

TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.

NOTES:

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRANDS. WRAP THE LIFTING LOOPS SO THAT EACH STRAND WILL CARRY ITS SHARE OF THE TOTAL LOAD. EXTEND LIFTING LOOPS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE WF58G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

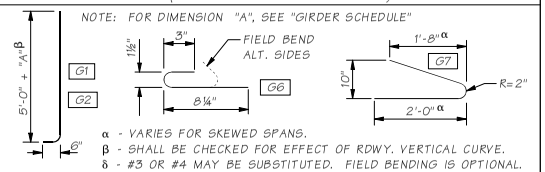
FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF58G\WF58G1.man							
Supervisor				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By				10	WASH.			
Checked By				JOB NUMBER				
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APP'D				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

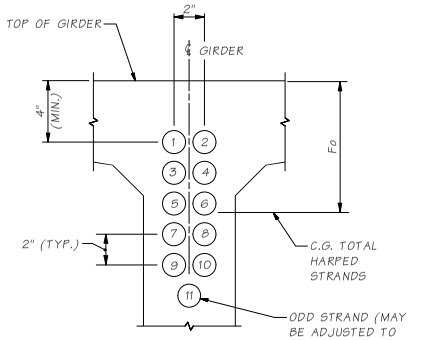
WF58G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO. — SHEET — OF — SHEETS

SR ___ JOB NO. ___ SHEET

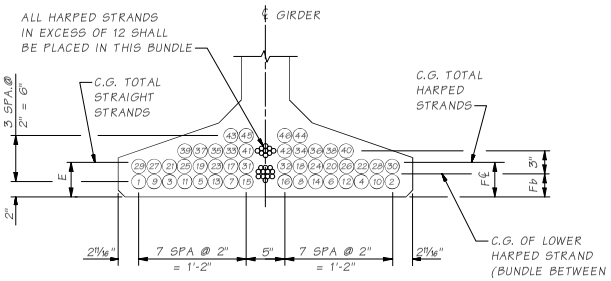
5.6-A9-1

Thu Feb 15 13:22:01 2007



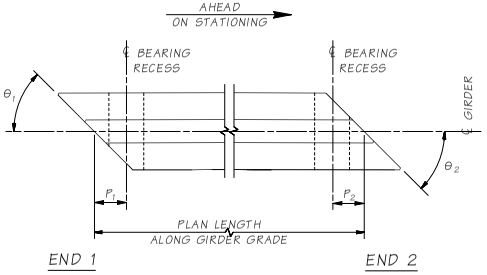
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

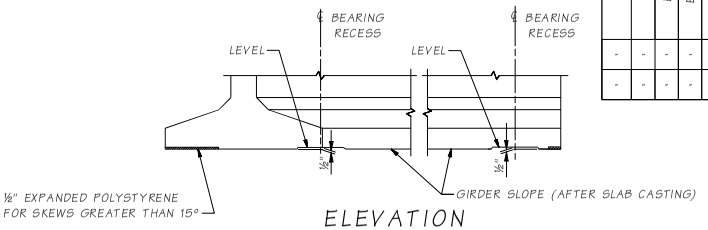
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



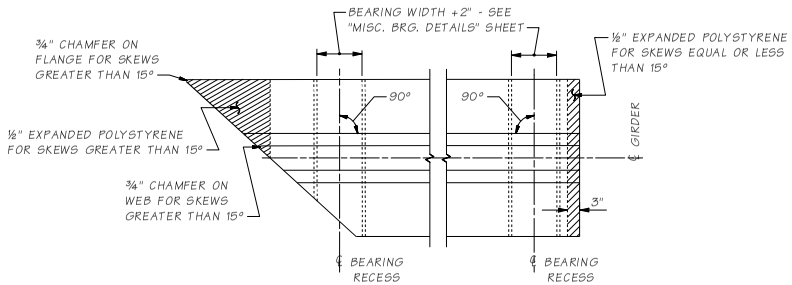
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

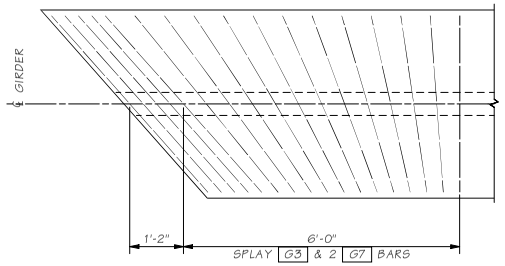
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'Ci (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

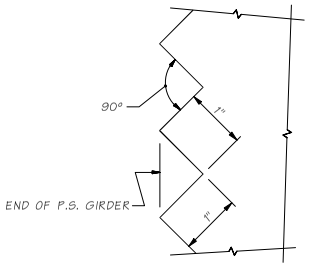


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF58G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF58G\WF58G2.man								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Feb 15 13:22:08 2007

BRIDGE AND STRUCTURES OFFICE

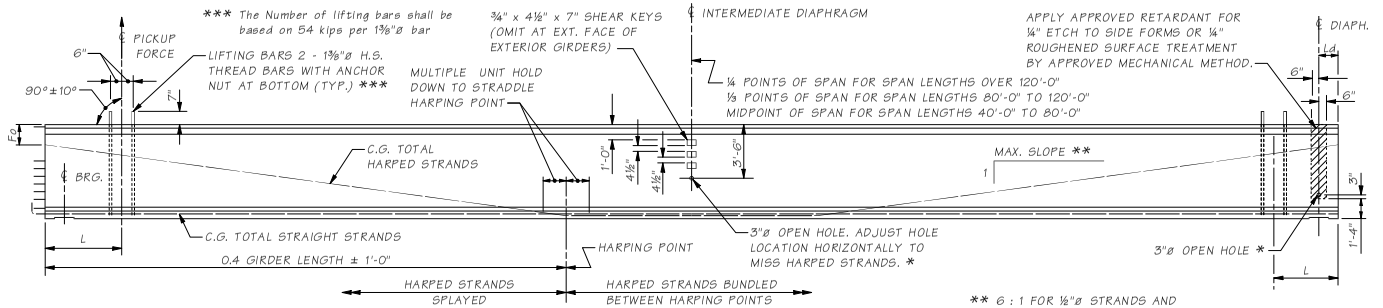
Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF58G GIRDER DETAILS 2 OF 3

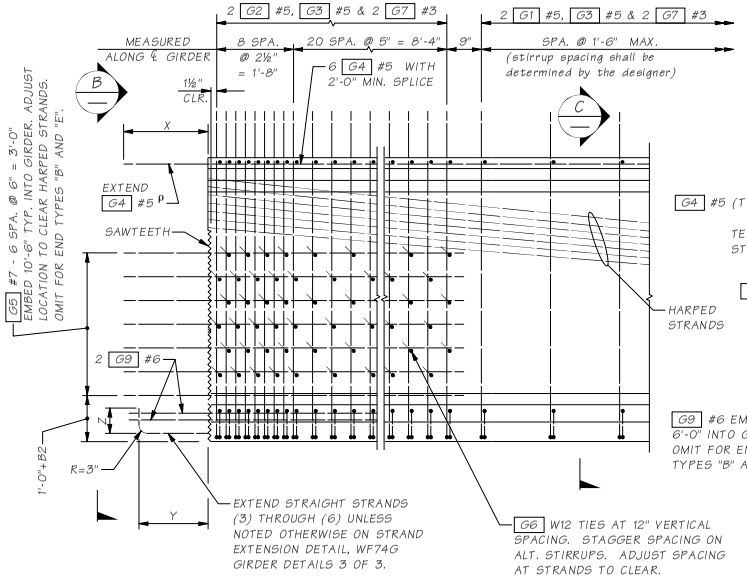
BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR | JOB NO. | SHEET



GIRDER ELEVATION

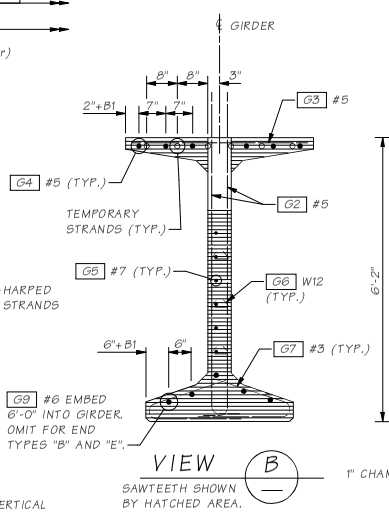
* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE INSERT OR APPROVED EQUAL. (TYP.)



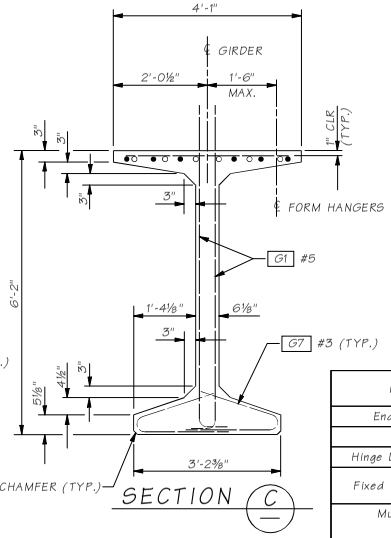
TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B



SECTION C

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D, CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. LIFTING BARS SHALL BE 1⅜"ø HIGH STRENGTH THREADED BARS (AASHTO M275 GRADE 150 MINIMUM.) LIFTING HARDWARE THAT CONNECTS TO THE THREADED BARS SHALL BE DESIGNED, DETAILED AND FURNISHED BY THE CONTRACTOR. LIFTING FORCES ON THREADED BARS SHALL BE WITHIN 10 DEGREES OF PERPENDICULAR TO THE TOP OF THE GIRDER. ALTERNATE LIFTING CONFIGURATIONS MAY BE SUBMITTED BY THE CONTRACTOR IN ACCORDANCE WITH SECTION 6-02.3(25)L OF THE STANDARD SPECIFICATIONS. EXTEND LIFTING BARS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE WF74G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

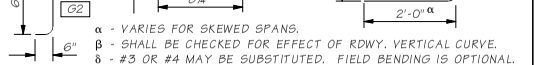
FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G1.man			REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor				10	WASH			
Designed By					JOB NUMBER			
Checked By								
Detailed By								
Bridge Projects Engr.								
Prelim Plan By								
Architect/Specialist	DATE	REVISION	BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

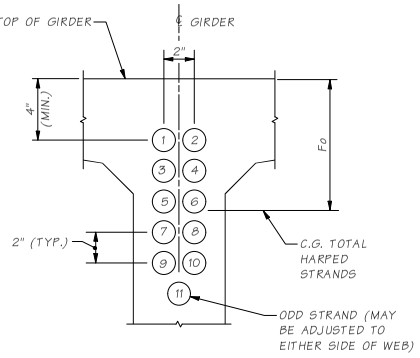
WF74G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO.

SHEET OF SHEETS

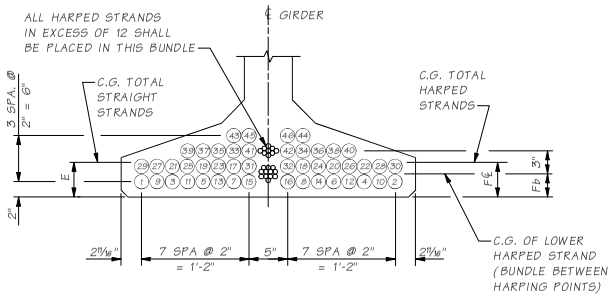
SR JOB NO. 5.6-A10-1 SHEET

Thu Feb 15 13:22:45 2007



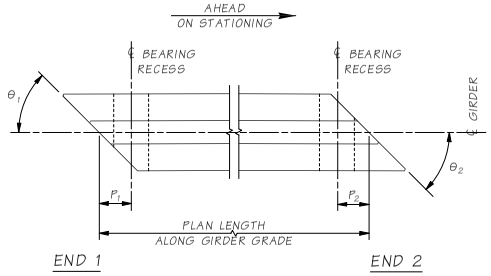
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

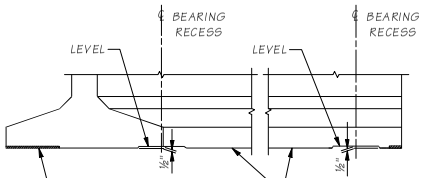
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



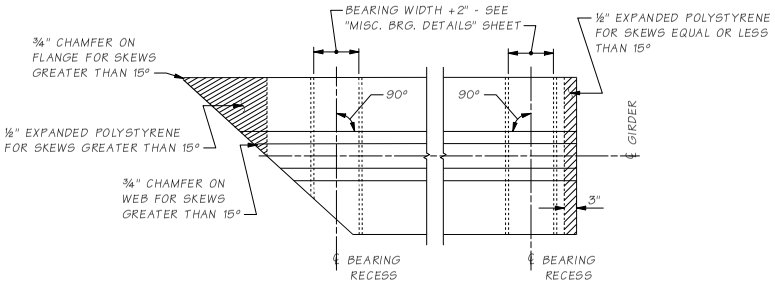
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

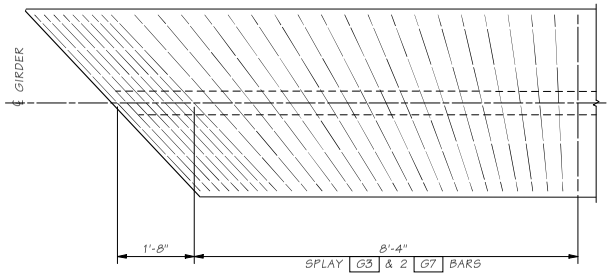
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'CI (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

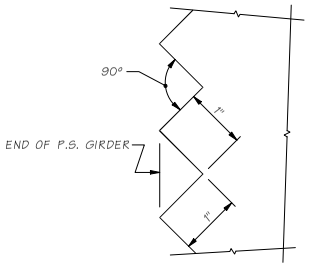


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF74G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G2.man					
Supervisor						
Designed By						
Checked By						
Detailed By						
Bridge Projects Engr.						
Prelim Plan By						
Architect/Specialist	DATE	REVISION	BY	APPD		

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH.			
JOB NUMBER				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

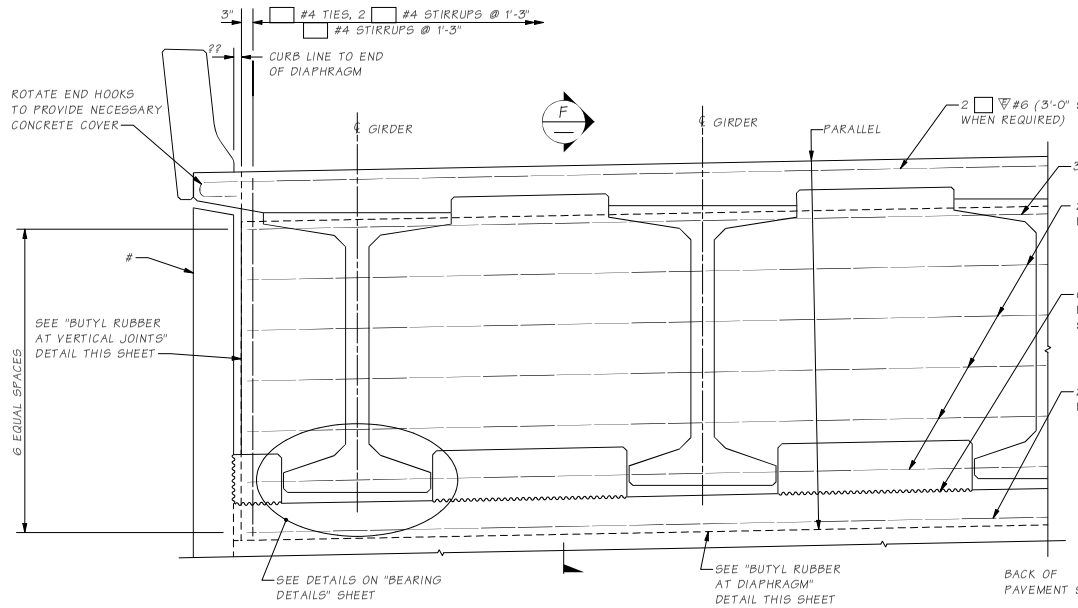
WF74G GIRDER DETAILS 2 OF 3

BRIDGE SHEET NO. SHEET OF SHEETS

SR JOB NO. SHEET

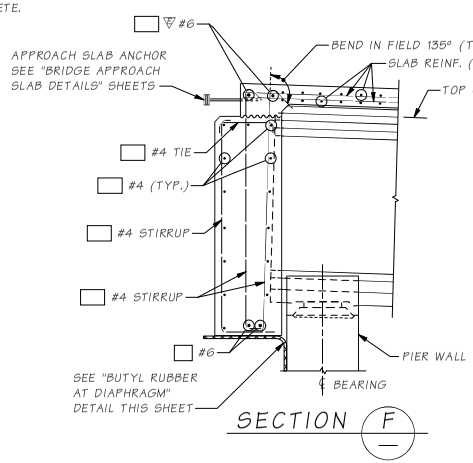
5.6-A10-2

Thu Feb 15 13:22:38 2007



TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



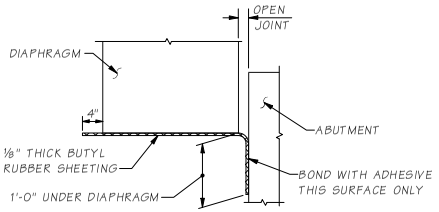
SECTION F

NOTE TO DESIGNER

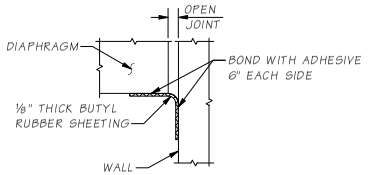
If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.

ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ELEVATION BUTYL RUBBER AT DIAPHRAGM

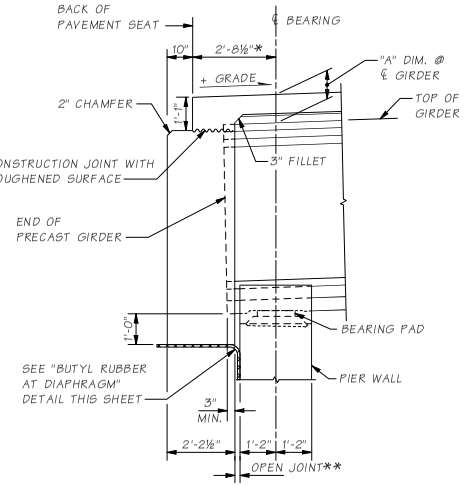


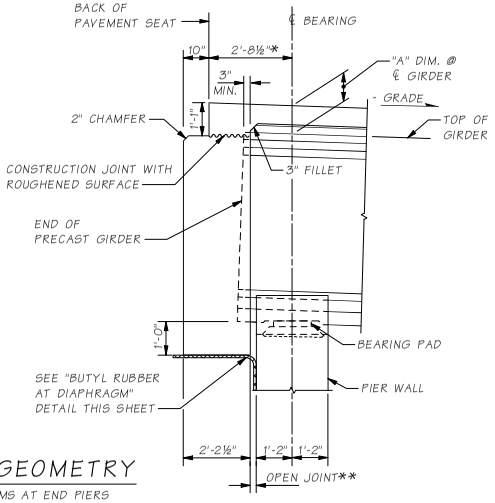
PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint

NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.





END DIAPHRAGM GEOMETRY

SECTIONS THROUGH END DIAPHRAGMS AT END PIERS
SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G_END_DIA_ON_GIR.MAN							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF74G END DIAPHRAGM ON GIRDER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

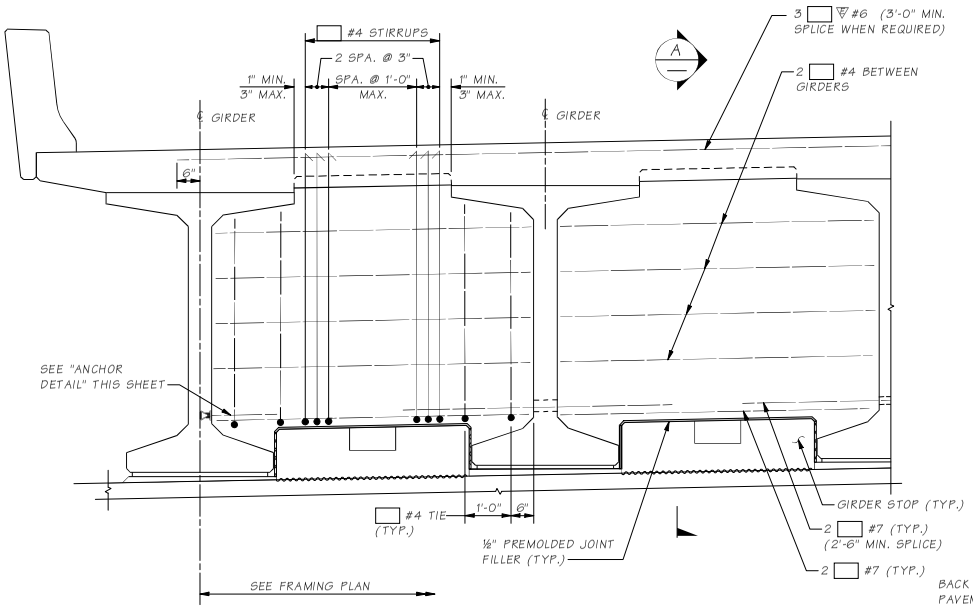
SHEET

JOB NO.

SR

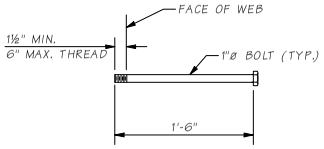
5.6-A10-3

Thu Feb 15 13:22:28 2007



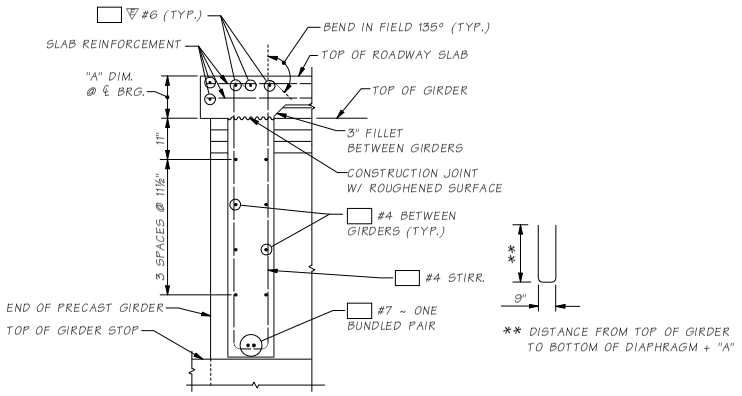
ELEVATION
END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM

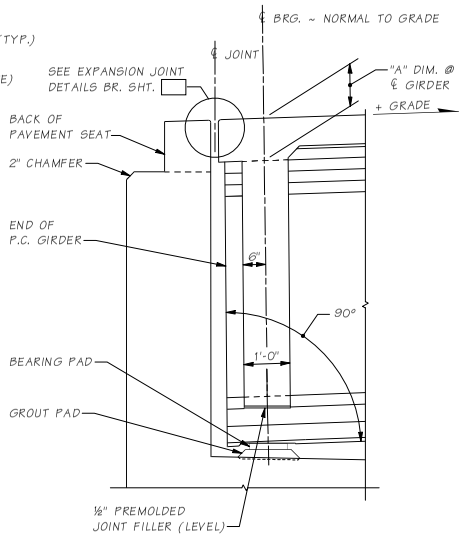


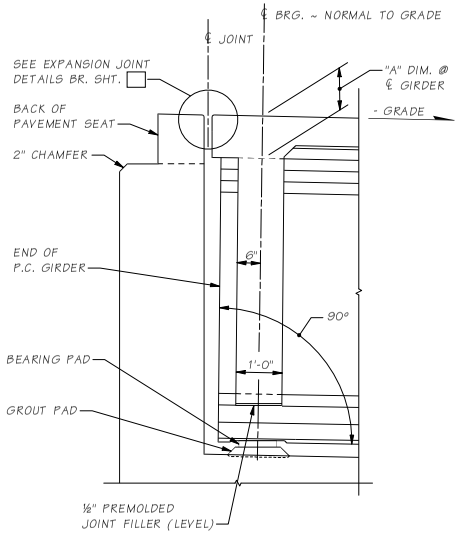
ANCHOR DETAIL

ASTM A-307



SECTION A





ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF74G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

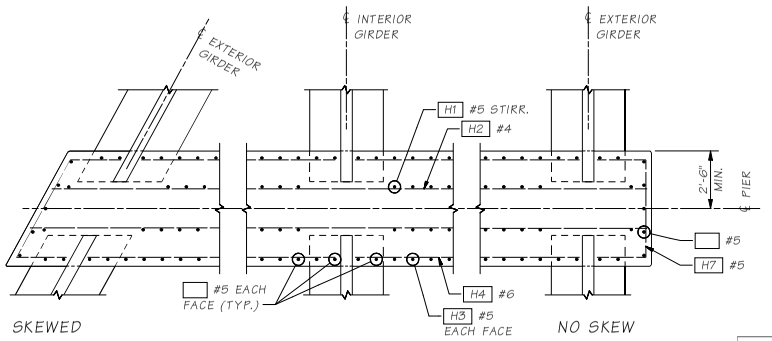
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ___ JOB NO. ___ SHEET ___

5.6-A10-4

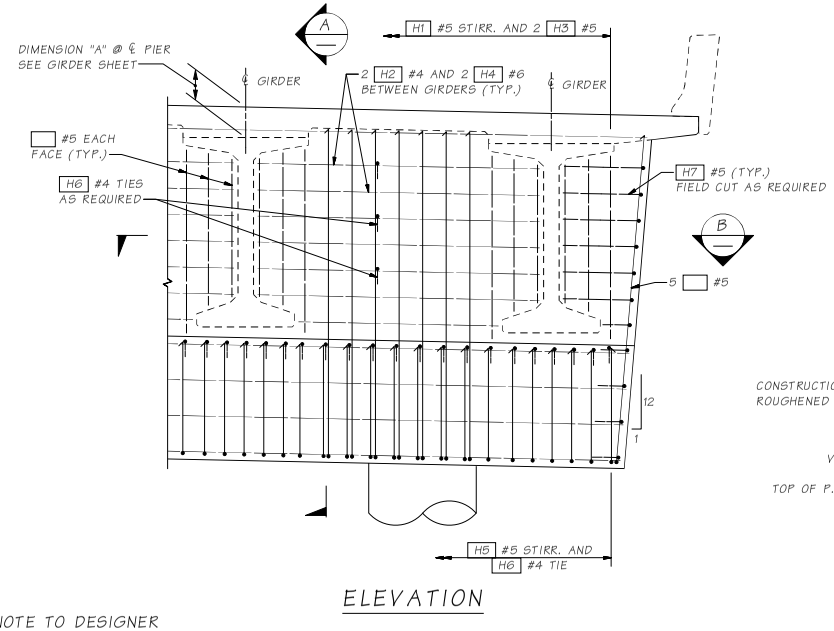
Thu Feb 15 13:22:33 2007



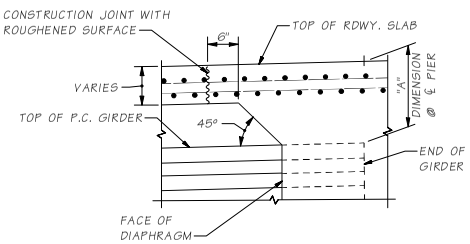
SECTION B

ELEVATION AT TOP OF OAK BLOCK

GIRDER	PIER ?	
	BACK STATION	AHEAD STATION

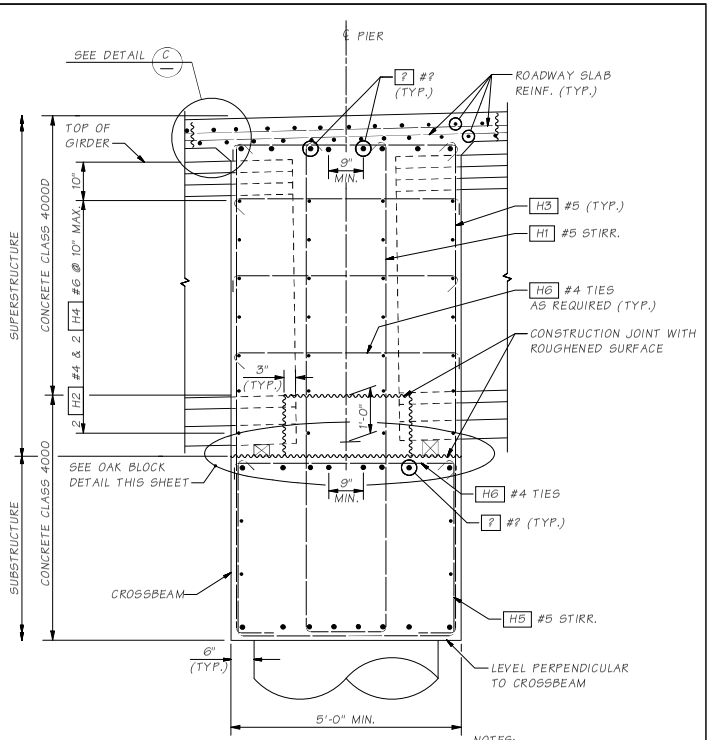


ELEVATION



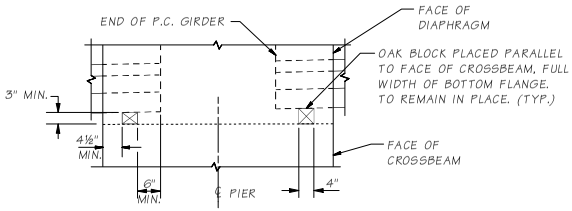
DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.

Bridge Design Engr.	M:\STANDARDS\Girders\WF 1-Girders\WF74G\WF74G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION		BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

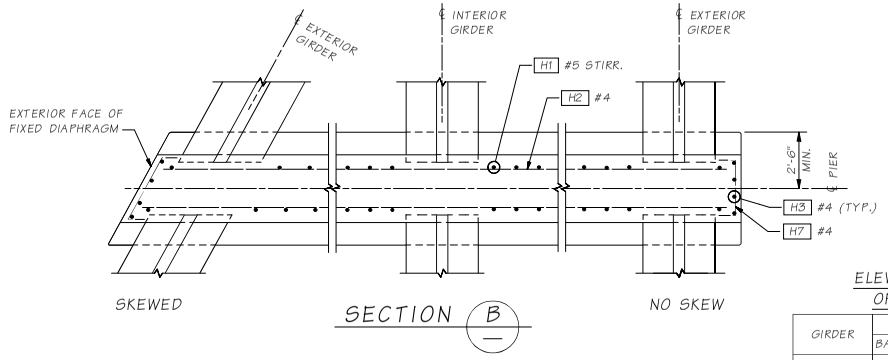
WF74G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. 5-6-A10-5 SHEET

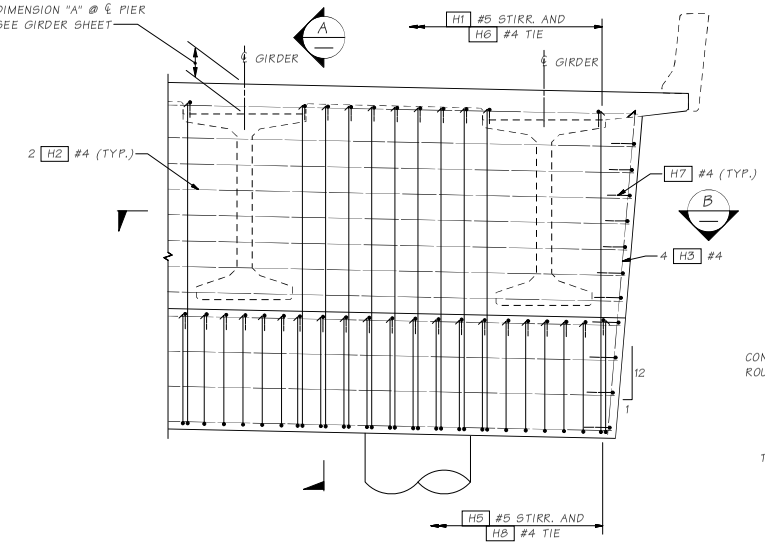
Thu Feb 15 13:22:24 2007



SECTION B

ELEVATION AT TOP OF OAK BLOCK

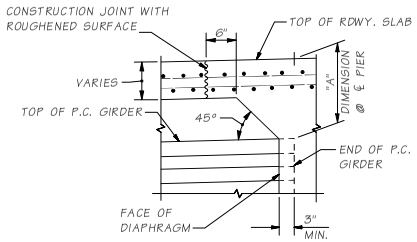
GIRDER	PIER ?	
	BACK STATION	AHEAD STATION



ELEVATION

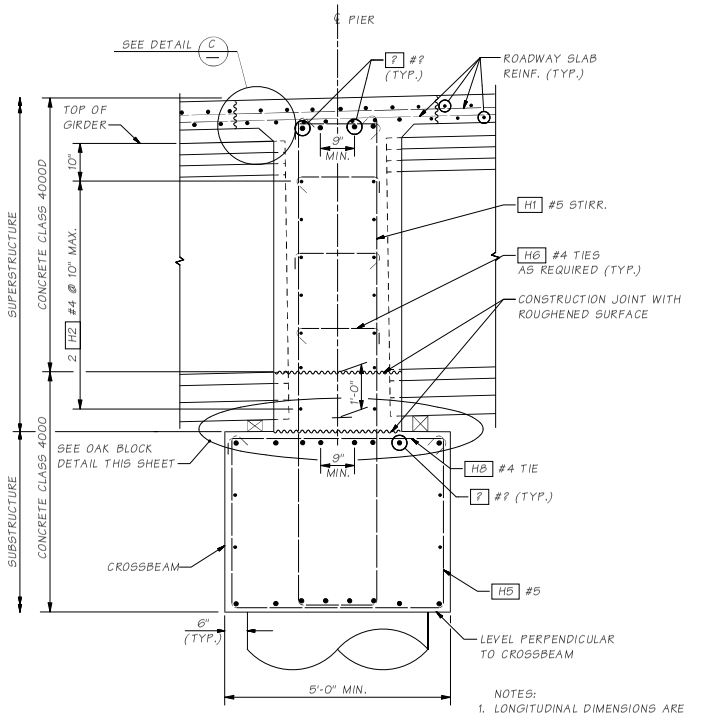
NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.



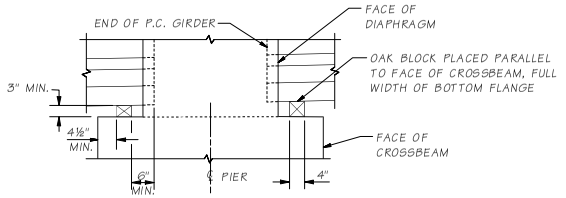
DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

Bridge Design Engr.	M:\STANDARDS\Girders\WF 1-Girders\WF74G\WF74G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

Thu Feb 15 13:22:18 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

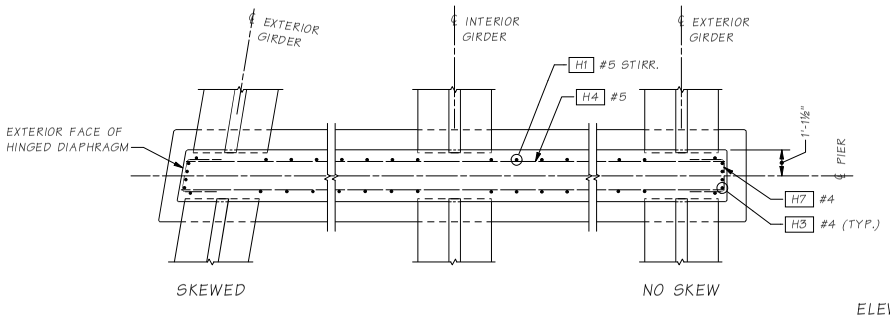
WF74G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

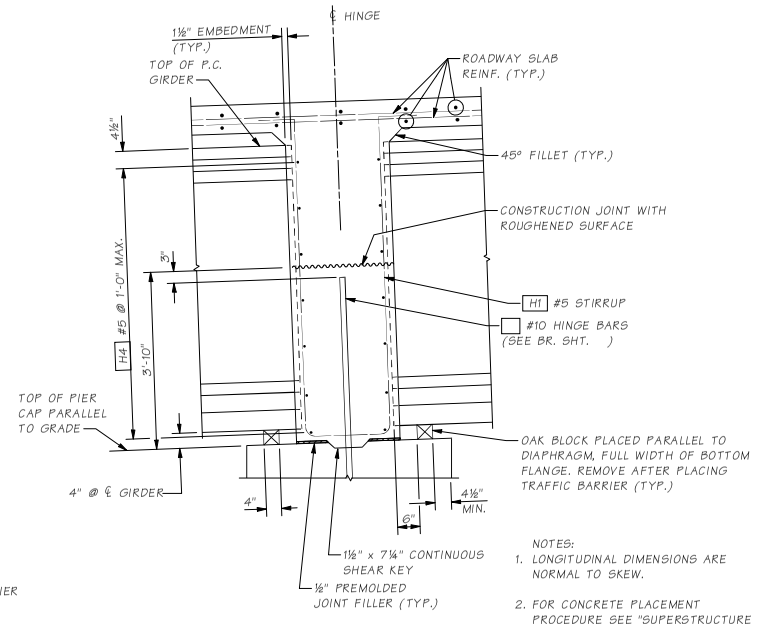
5.6-A10-6



SECTION B

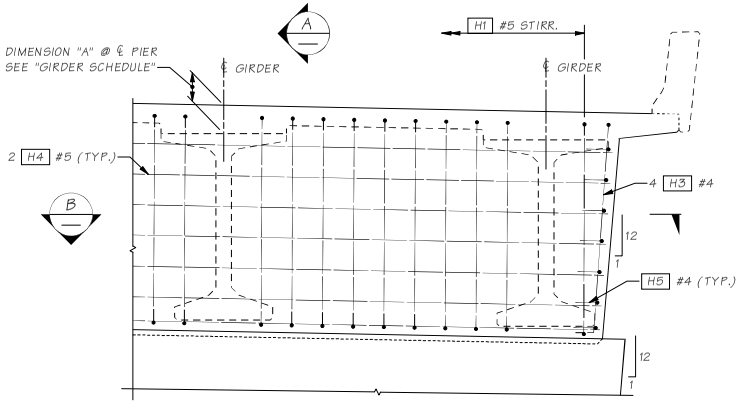
ELEVATION AT TOP OF OAK BLOCK

GIRDER	PIER ?	
	BACK STATION	AHEAD STATION

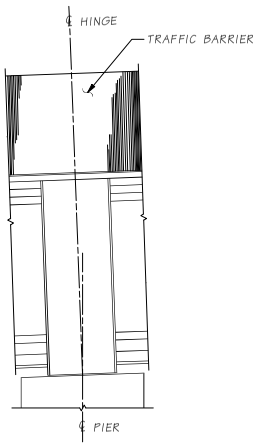


SECTION A

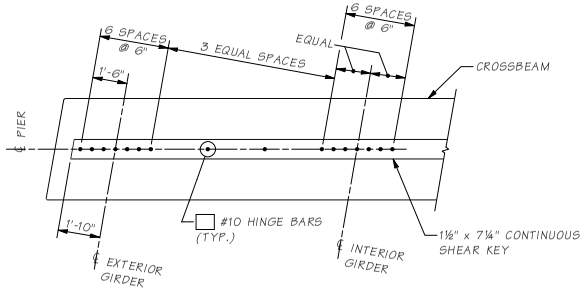
NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.
3. EXTENDED STRANDS AND GIRDER REINFORCING NOT SHOWN FOR CLARITY.



ELEVATION



END VIEW
HINGE DIAPHRAGM



HINGE BAR PLAN

Hinge bar plan is shown for designer. The actual hinge bars detail shall be shown on the crossbeam details sheet.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G_HINGE_DIAPHRAGM_INTER_PIER_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION		BY	APPD				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF74G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

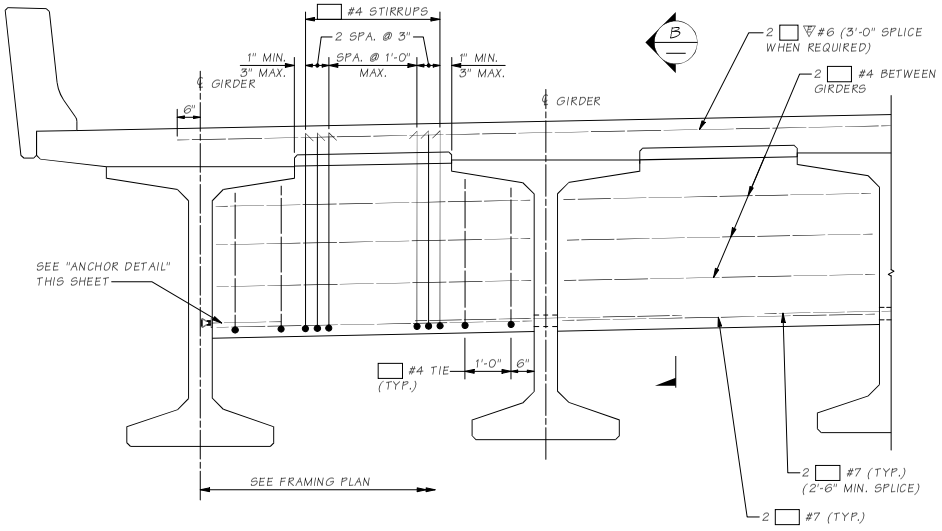
BRIDGE SHEET NO.

SHEET OF SHEETS

SR ____ JOB NO. ____ SHEET

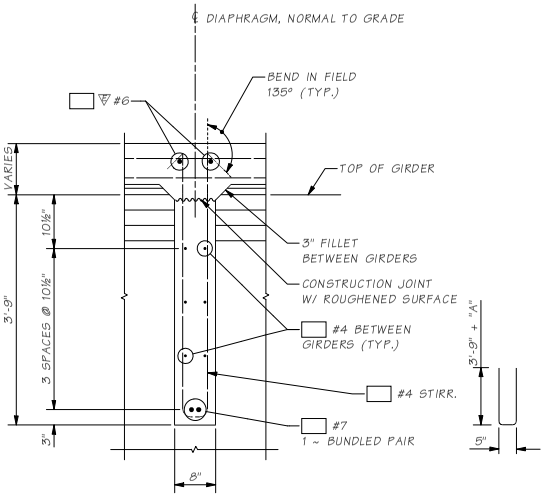
5.6-A10-7

Thu Feb 15 13:22:14 2007

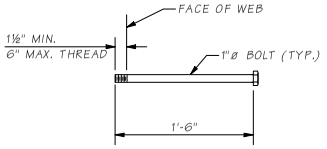


ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION B



ANCHOR DETAIL
ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

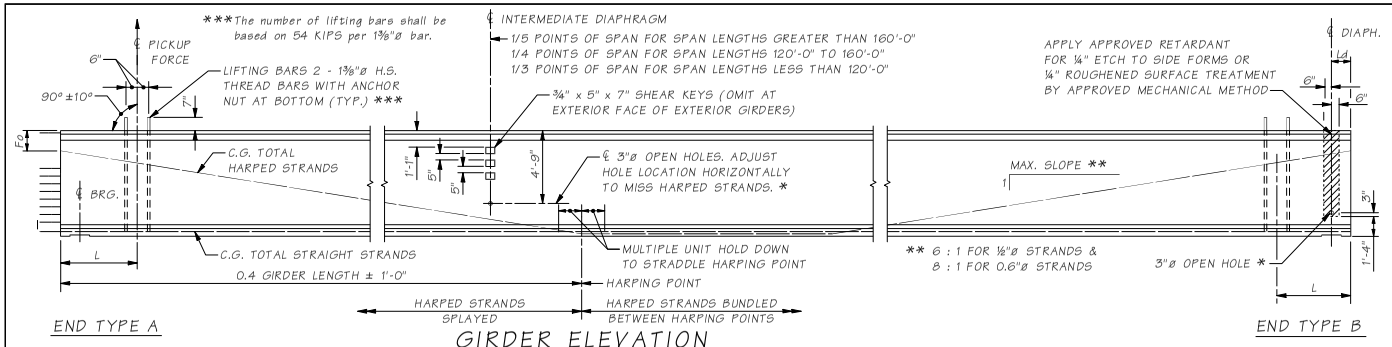
SR _____ JOB NO. _____ SHEET _____

5.6-A10-8

Bridge Design Engr: Jerome A. Weigel	M:\STANDARDS\Girders\WF I-Girders\WF74G\WF74G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE	STANDARD PRESTRESSED CONCRETE GIRDERS
Supervisor Allen, TM					10	WASH.					
Designed By					JOB NUMBER					Washington State Department of Transportation	WF74G INTERMEDIATE DIAPHRAGM DETAILS
Checked By											
Detailed By											
Bridge Projects Engr.											
Prelim. Plan By											
Architect/Specialist	DATE	REVISION	BY	APP'D							

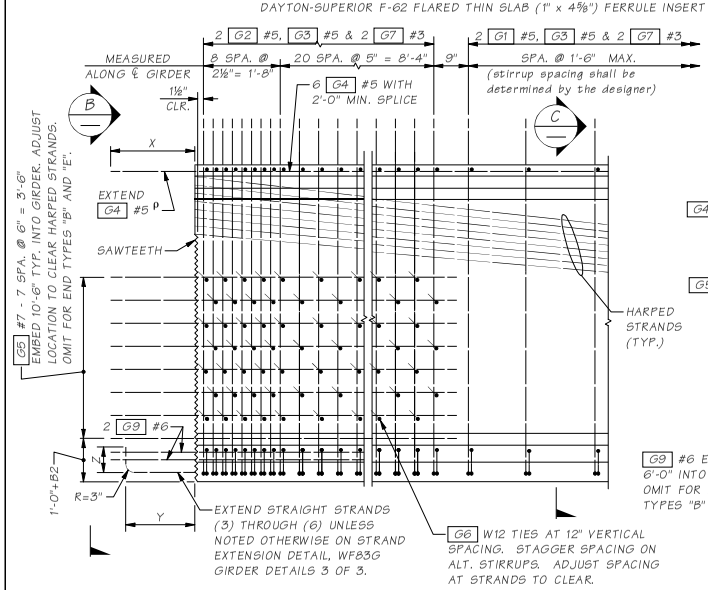
BRIDGE SHEET NO. SHEET OF SHEETS

Thu Feb 15 13:22:50 2007



GIRDER ELEVATION

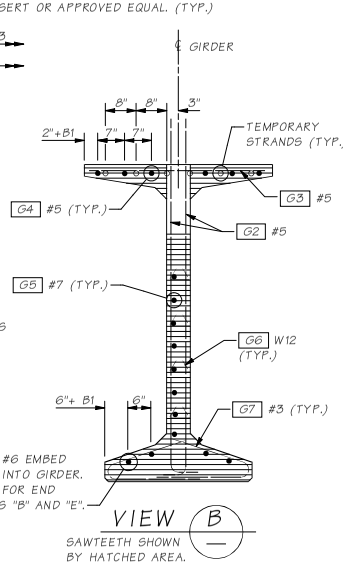
* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE INSERT OR APPROVED EQUAL. (TYP.)



TYPICAL END ELEVATION

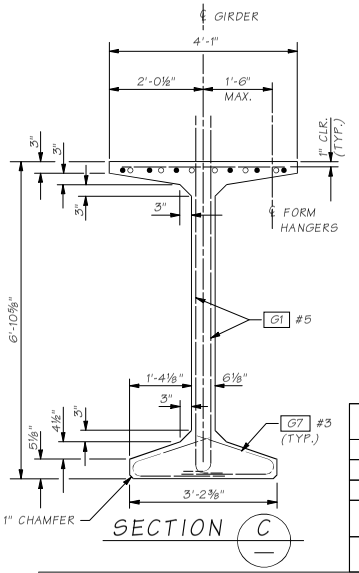
END TYPE C SHOWN, OTHER END TYPES SIMILAR.

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B

SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL STRANDS SHALL BE ½" OR 0.6"ø LOW RELAXATION STRANDS (AASHTO M203 GRADE 270.)
3. FOR END TYPES A, C AND D CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN. FOR END TYPES B AND E CUT ALL STRANDS 1" BELOW CONCRETE SURFACE AND GROUT WITH AN APPROVED EPOXY GROUT.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. LIFTING BARS SHALL BE 1⅜"ø HIGH STRENGTH THREADED BARS (AASHTO M275 GRADE 150 MINIMUM.) LIFTING HARDWARE THAT CONNECTS TO THE THREADED BARS SHALL BE DESIGNED, DETAILED AND FURNISHED BY THE CONTRACTOR. LIFTING FORCES ON THREADED BARS SHALL BE WITHIN 10 DEGREES OF PERPENDICULAR TO THE TOP OF THE GIRDER. ALTERNATE LIFTING CONFIGURATIONS MAY BE SUBMITTED BY THE CONTRACTOR IN ACCORDANCE WITH SECTION 6-02.3(25)L OF THE STANDARD SPECIFICATIONS. EXTEND LIFTING BARS ENDING WITH A 9" LONG 90° HOOK TO WITHIN 3" CLEAR OF THE BOTTOM OF THE GIRDER.
6. CAUTION SHALL BE EXERCISED IN HANDLING AND PLACING GIRDERS. ALL GIRDERS SHALL BE CHECKED BY THE CONTRACTOR TO ENSURE THAT THEY ARE BRACED ADEQUATELY TO PREVENT TIPPING AND TO CONTROL LATERAL BENDING DURING SHIPPING. ONCE ERECTED, ALL GIRDERS SHALL BE BRACED LATERALLY TO PREVENT TIPPING UNTIL THE DIAPHRAGMS ARE CAST AND CURED.
7. FORMS FOR BEARING PAD RECESSES SHALL BE CONSTRUCTED AND FASTENED IN SUCH A MANNER AS TO NOT CAUSE DAMAGE TO THE GIRDER DURING THE STRAND RELEASE OPERATION.
8. FOR SAWTOOTH DETAILS SEE WF83G GIRDER DETAILS 2 OF 3.
9. TEMPORARY STRANDS ARE EITHER PRETENSIONED OR POST-TENSIONED. IF PRETENSIONED, THESE TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 10'-0" OF THE GIRDER LENGTH. AS AN ALTERNATE, TEMPORARY STRANDS MAY BE POST-TENSIONED BEFORE THE GIRDER IS LIFTED FROM THE FORM. TEMPORARY STRANDS SHALL BE CUT AFTER ALL GIRDERS ARE ERECTED, BUT BEFORE DIAPHRAGMS ARE CAST.

Diaphragm Type	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

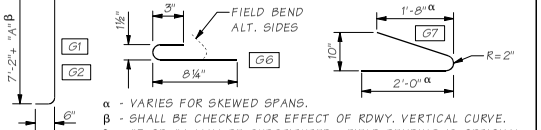
FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12 δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

NOTE: FOR DIMENSION "A", SEE "GIRDER SCHEDULE"



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G1.man							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

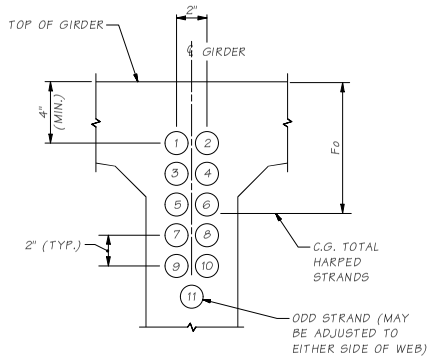
WF83G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO.

SHEET OF SHEETS

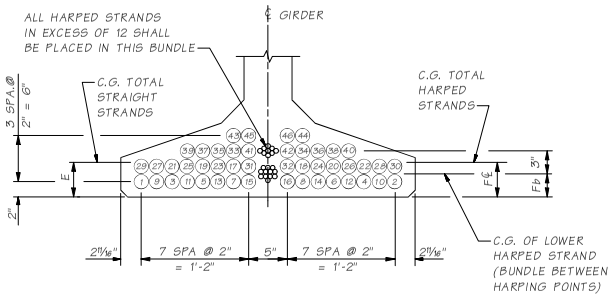
SR JOB NO. 5.6-A11-1

Thu Feb 15 13:20:43 2007



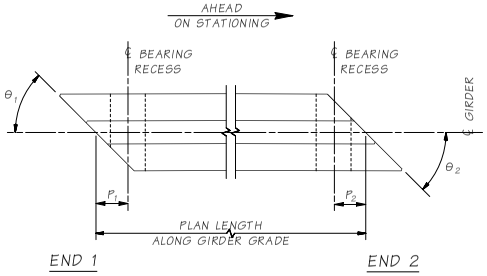
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

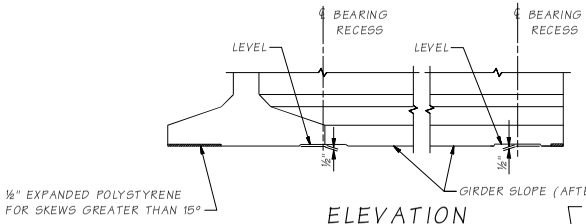
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



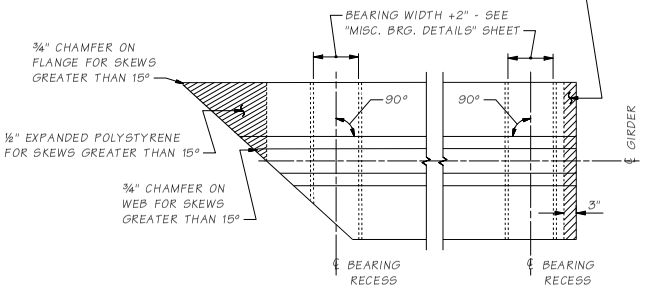
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

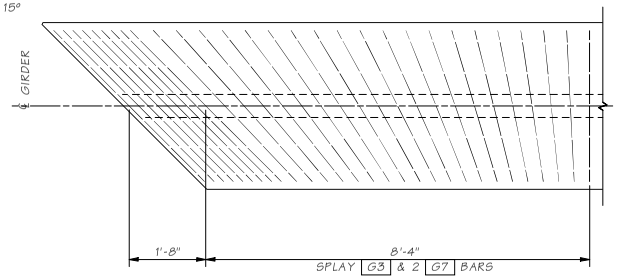
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'C (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'CI (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

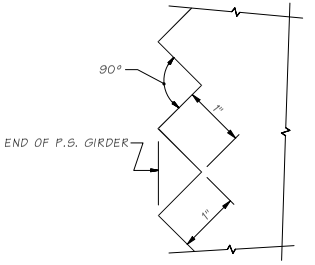


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF83G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G2.man									
Supervisor										
Designed By										
Checked By										
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH.			
JOB NUMBER				

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

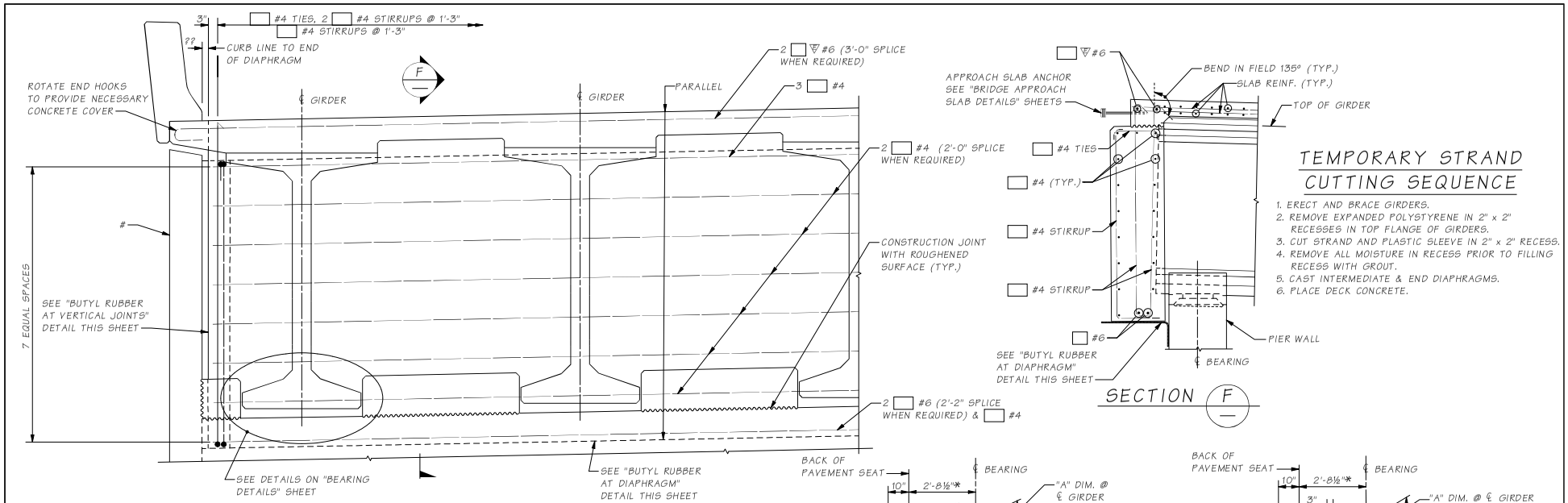
STANDARD PRESTRESSED CONCRETE GIRDERS

W83G GIRDER DETAILS 2 OF 3

BRIDGE SHEET NO.
SHEET
OF
SHEETS

SHEET
JOB NO.
SR
5.6-A11-2

Thu Feb 15 13:20:37 2007



TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

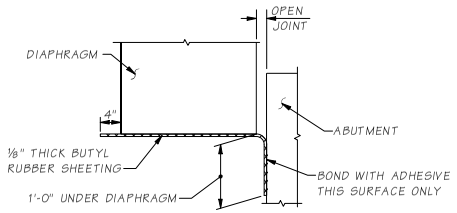
SECTION F

NOTE TO DESIGNER

If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.

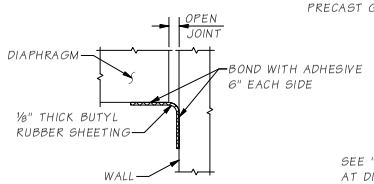
ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ELEVATION BUTYL RUBBER AT DIAPHRAGM

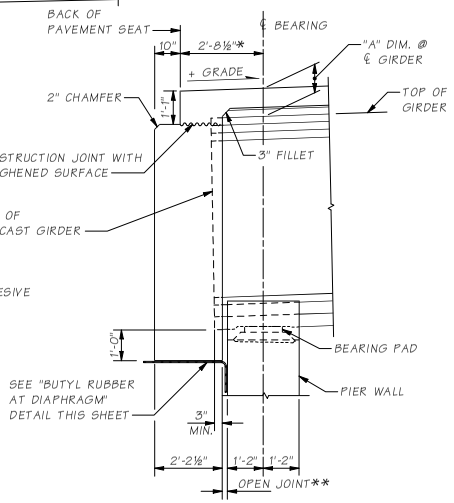
NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.

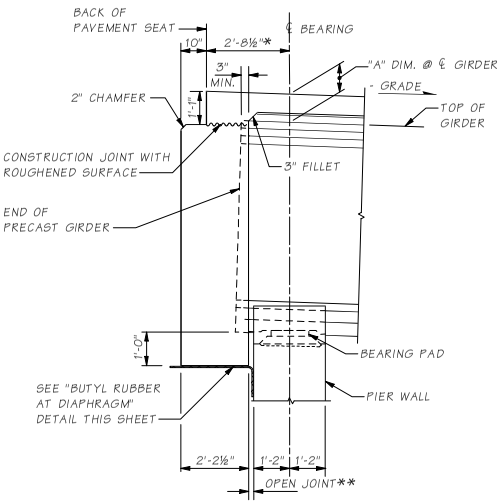


PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint





END DIAPHRAGM GEOMETRY

SECTIONS THROUGH END DIAPHRAGMS AT END PIERS
SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".
ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\WB3G\WB3G_END_DIA_ON_GIR.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

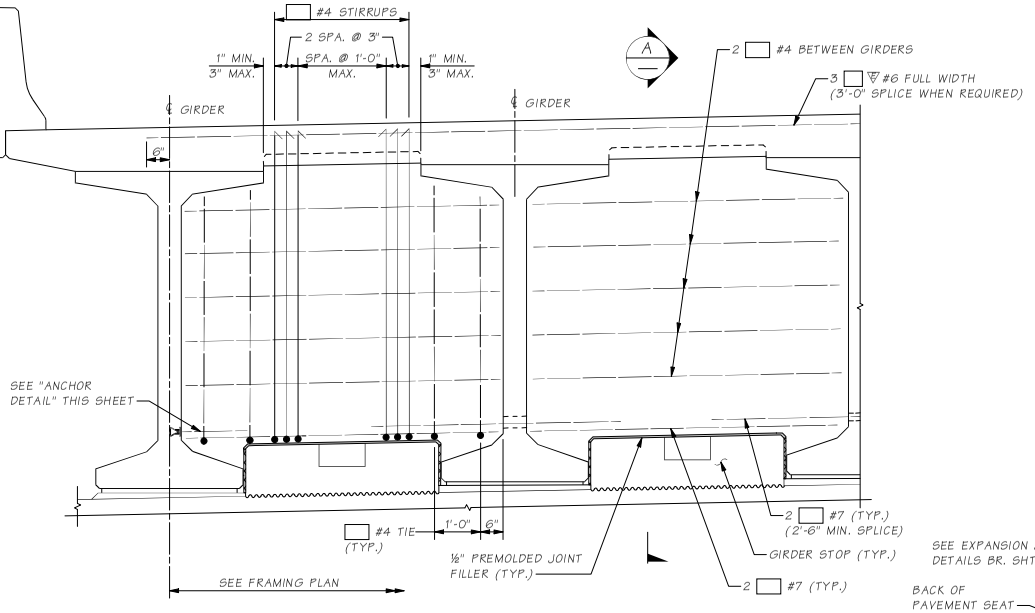
WF83G END DIAPHRAGM ON GIRDER DETAILS

BRIDGE SHEET NO. SHEET OF SHEETS

SR JOB NO. SHEET

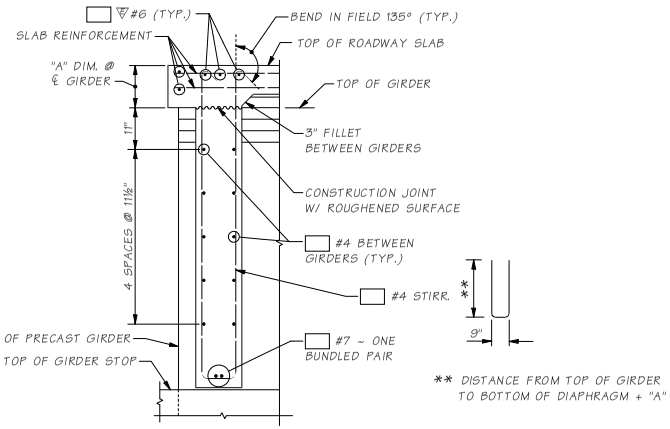
5.6-A11-3

Thu Feb 15 13:20:28 2007

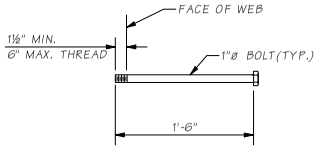


ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION A



ANCHOR DETAIL

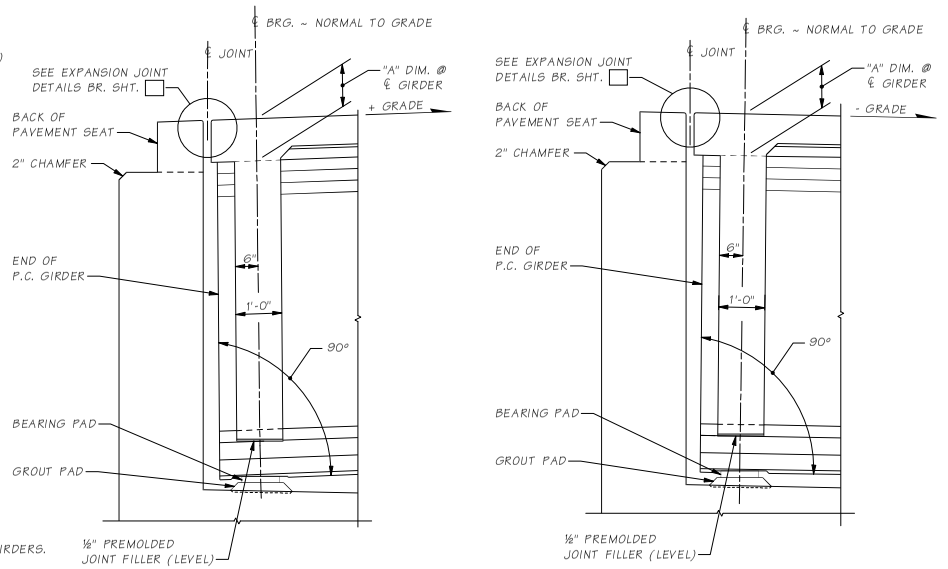
ASTM A-307

TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".



ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Feb 15 13:20:33 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

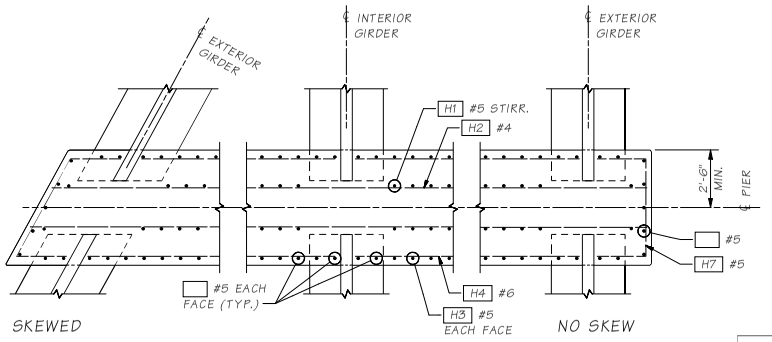
WF83G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

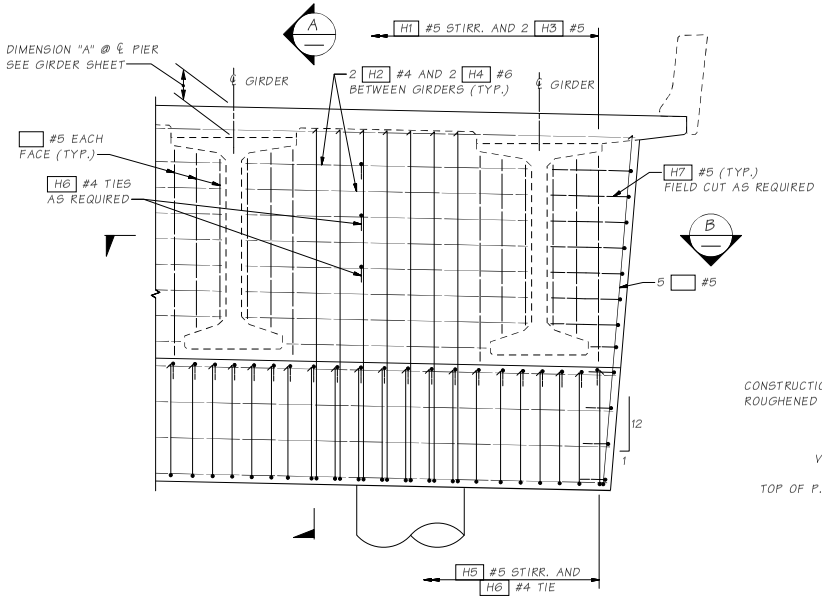
5.6-A11-4



SECTION B

ELEVATION AT TOP OF OAK BLOCK

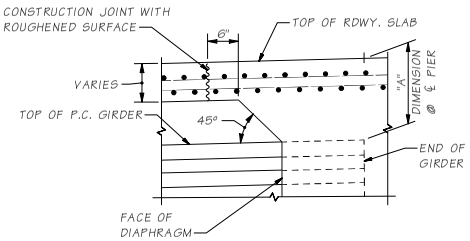
GIRDER	PIER ?	
	BACK STATION	AHEAD STATION



ELEVATION

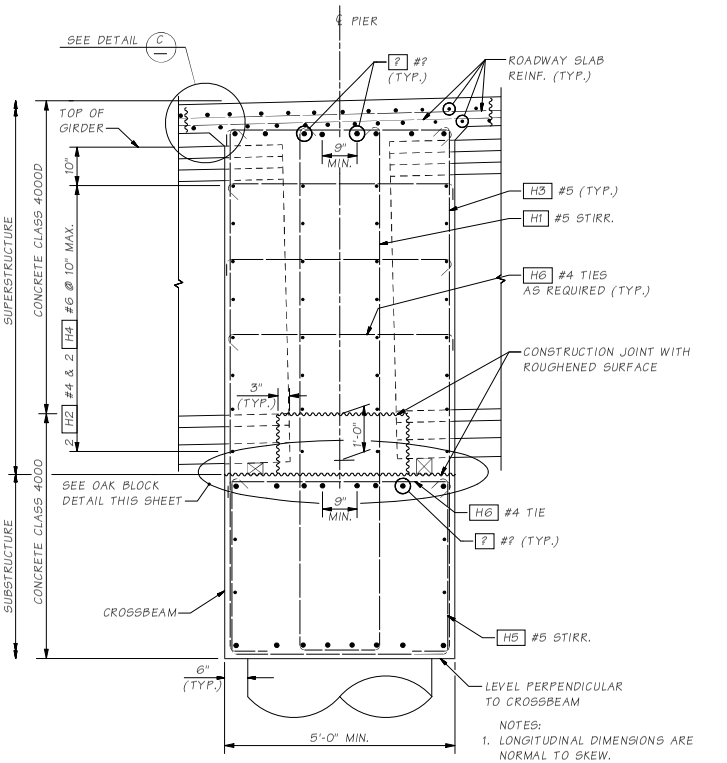
NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.



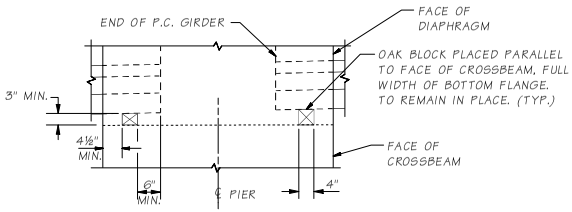
DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

Bridge Design Engr.	M:\STANDARDS\Girders\WF 1-Girders\WB3G\WB3G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

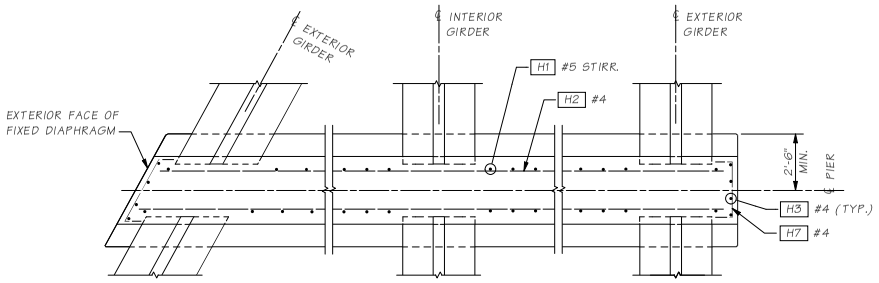
WF83G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET 5.6-A11-5

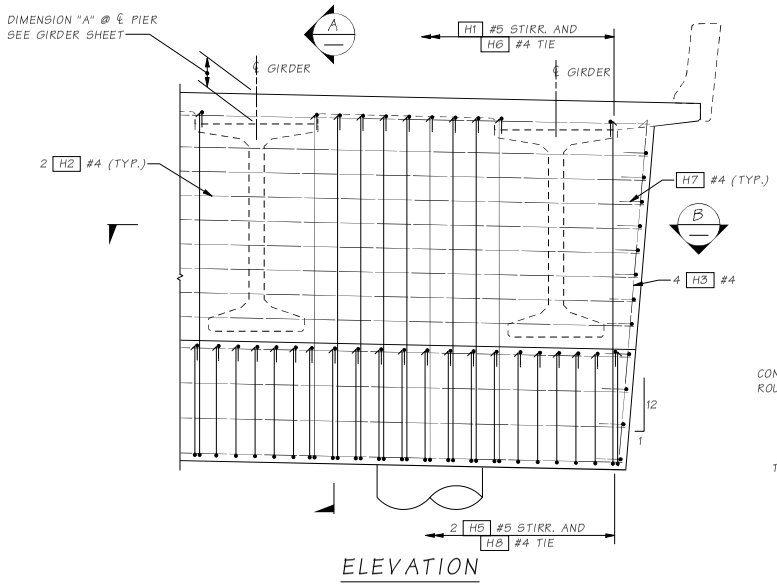
Thu Feb 15 13:20:22 2007



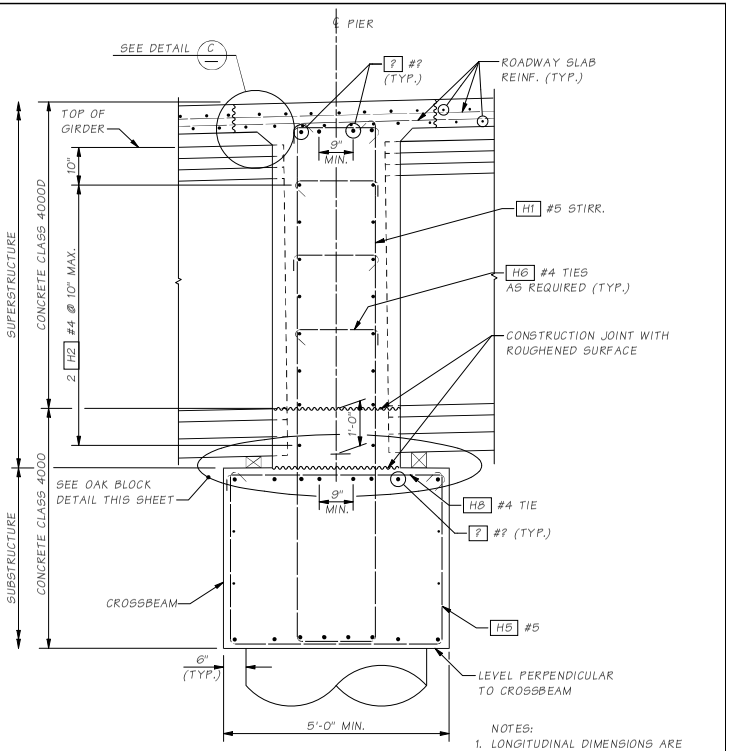
SECTION B

ELEVATION AT TOP OF OAK BLOCK

GIRDER	PIER ?	
	BACK STATION	AHEAD STATION

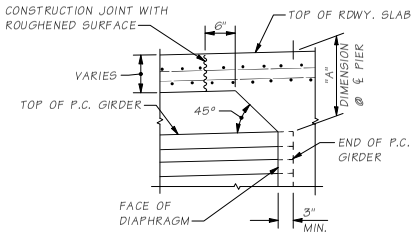


ELEVATION



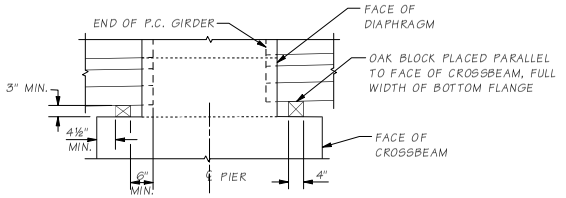
SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.



DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Feb 15 13:20:18 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

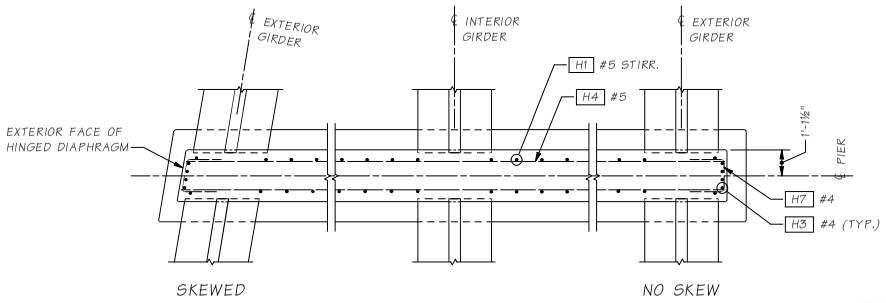
WF83G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

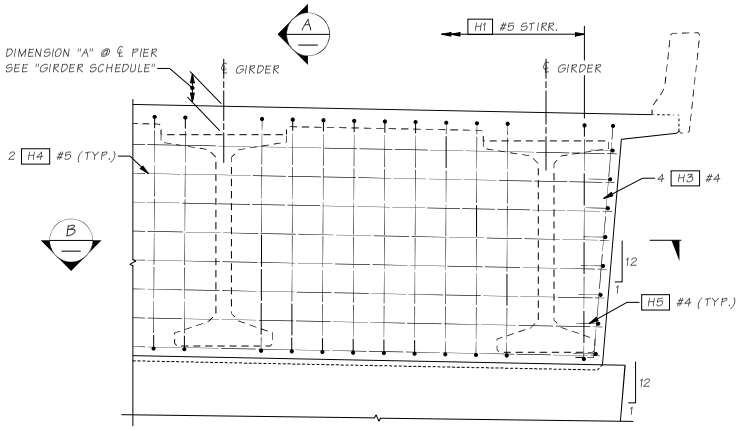
5.6-A11-6



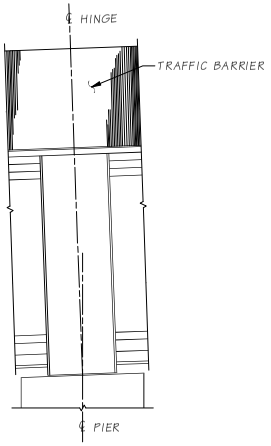
SECTION B

ELEVATION AT TOP OF OAK BLOCK

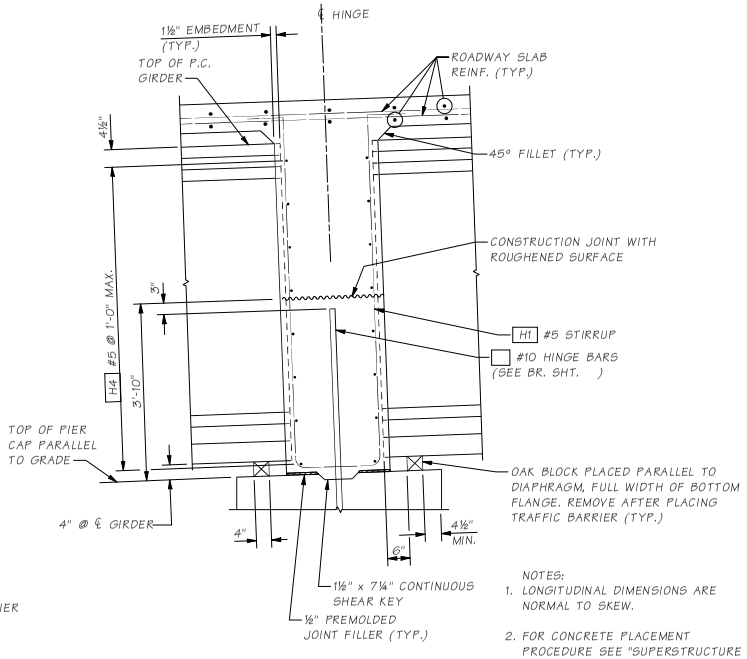
GIRDER	PIER ?	
	BACK STATION	AHEAD STATION



ELEVATION

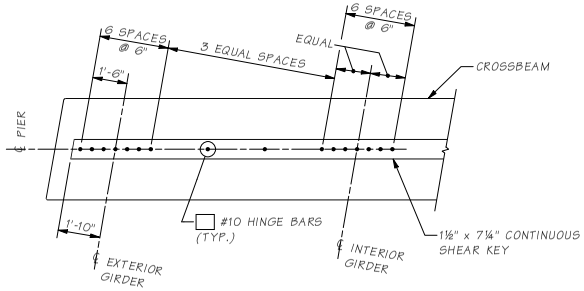


END VIEW
HINGE DIAPHRAGM



SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.
3. EXTENDED STRANDS AND GIRDER REINFORCING NOT SHOWN FOR CLARITY.



HINGE BAR PLAN

Hinge bar plan is shown for designer. The actual hinge bars detail shall be shown on the crossbeam details sheet.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G_HINGE_DIAPHRAGM_INTER_PIER_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

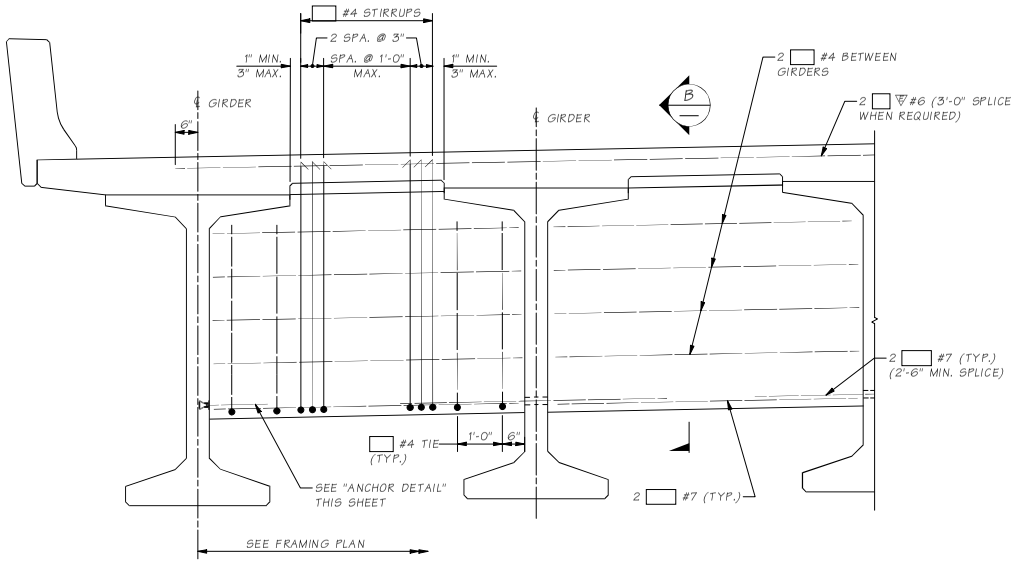
STANDARD PRESTRESSED CONCRETE GIRDERS

WF83G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.
SHEET
OF
SHEETS

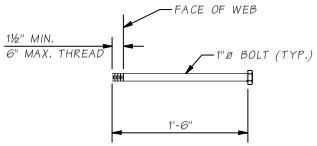
SR ____ SHEET
JOB NO. ____
5.6-A11-7

Thu Feb 15 13:20:12 2007



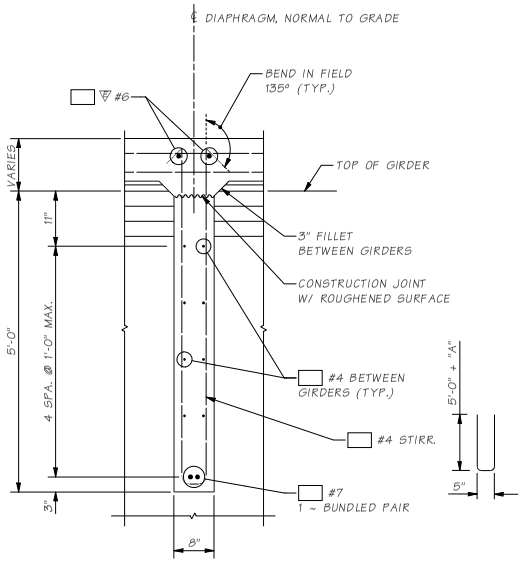
ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ANCHOR DETAIL

ASTM A-307



SECTION B

NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.
REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W83G\W83G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF83G INTERMEDIATE DIAPHRAGM DETAILS

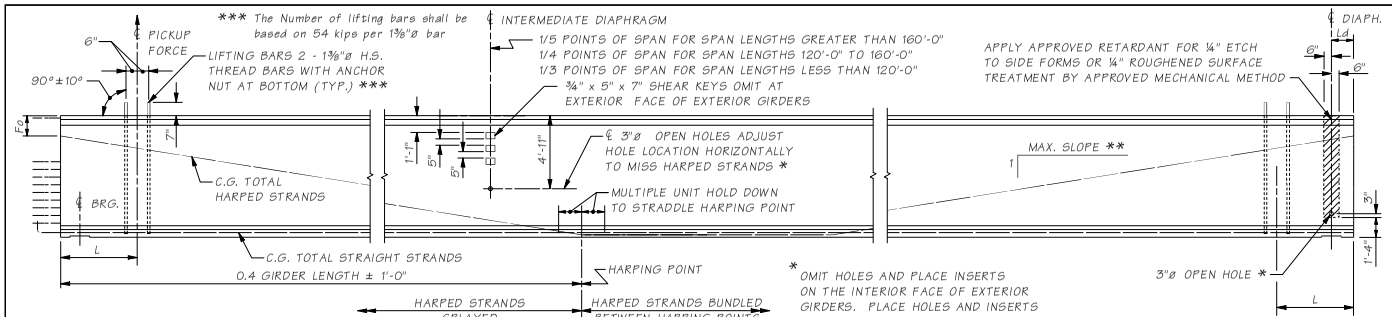
BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

5.6-A11-8

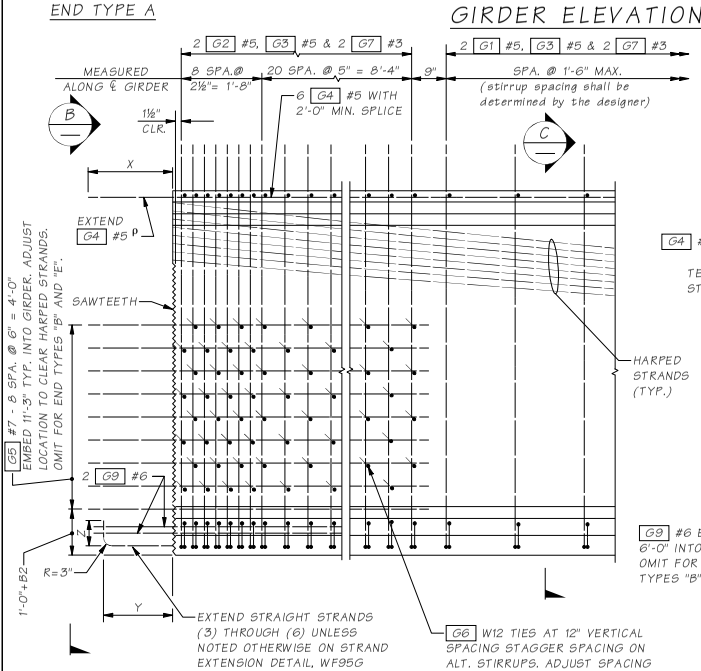
Thu Feb 15 13:20:49 2007



* OMIT HOLES AND PLACE INSERTS ON THE INTERIOR FACE OF EXTERIOR GIRDERS. PLACE HOLES AND INSERTS PARALLEL TO SKEW. INSERTS SHALL BE 1"ø BURKE HI-TENSILE, LANCASTER MALLEABLE, DAYTON-SUPERIOR F-62 FLARED THIN SLAB (1" x 4⅝") FERRULE INSERT OR APPROVED EQUAL. (TYP.)

** 6 : 1 FOR ½"ø STRANDS AND 8 : 1 FOR 0.6"ø STRANDS

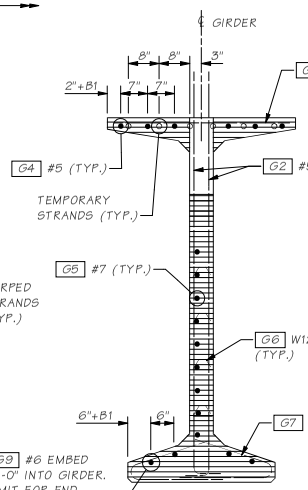
END TYPE A — GIRDER ELEVATION — END TYPE B



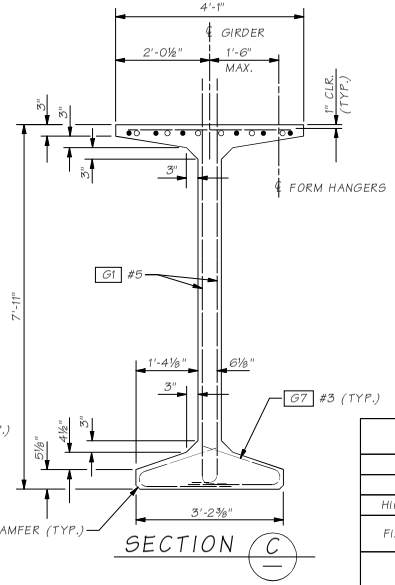
TYPICAL END ELEVATION

END TYPE C SHOWN, OTHER END TYPES SIMILAR

ρ FIELD BENDING REQUIRED TO OBTAIN 1½" CONCRETE COVER AT PAVEMENT SEAT.



VIEW B — SAWTEETH SHOWN BY HATCHED AREA.



SECTION C

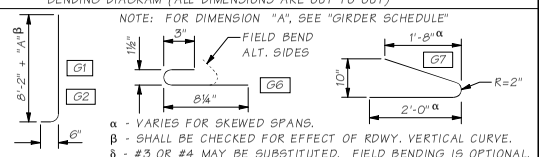
DIAPHRAGM TYPE	END TYPE	BEARING RECESS	X	Y	Z	SAWTEETH
End Diaph. on Girder	A	YES	1'-10"	1'-6"	9"	YES
"L" Abutment	B	YES	0"	0"	0"	NO
Hinge Diaph. on Interm. Pier	C	NO	1'-10"	1'-6"	9"	YES
Fixed Diaph. @ Interm. Pier	D	NO	1'-10"	ALT. 1 OR ALT. 2 STRAND EXTEN.		YES
Multi. Simple Spans @ Interm. Pier	E	YES	0"	0"	0"	NO

FOR END TYPE "C"

ENDS AHEAD ON STATION
G5 BARS LEFT OF ℄
B1 = 0" (G4 , G9)
B2 = 0" (G5)
ENDS BACK ON STATION
G5 BARS RIGHT OF ℄
B1 = 1½"(G4 , G9)
B2 = 3" (G5)

MARK	LOCATION	SIZE	
G1	GIRDER STIRRUPS	5	
G2	GIRDER END STIRRUPS	5	
G3	GIRDER TOP FLANGE	5	STR.
G4	GIRDER LONGIT. FULL LENGTH	5	STR.
G5	GIRDER END LONGIT.	7	STR.
G6	GIRDER END TIES	W12δ	
G7	GIRDER BOT. FLANGE TIES	3	
G9	GIRDER END LONGIT.	6	STR.

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT)



α - VARIES FOR SKEWED SPANS.
β - SHALL BE CHECKED FOR EFFECT OF RDWY. VERTICAL CURVE.
δ - #3 OR #4 MAY BE SUBSTITUTED. FIELD BENDING IS OPTIONAL.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G1.man							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

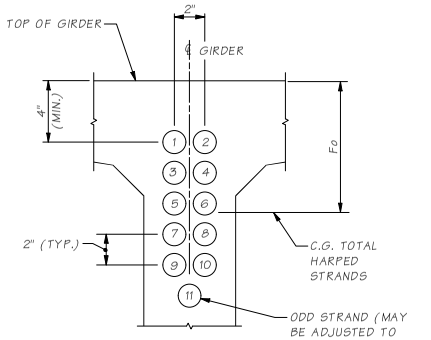
STANDARD PRESTRESSED CONCRETE GIRDERS

WF95G GIRDER DETAILS 1 OF 3

BRIDGE SHEET NO. — SHEET OF SHEETS

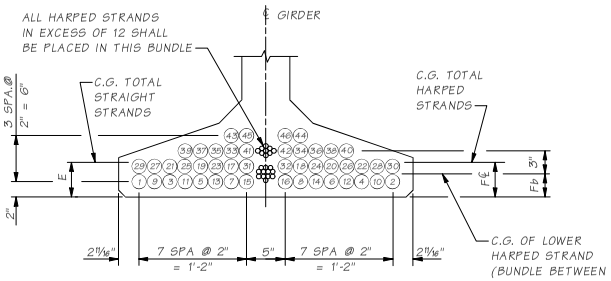
SHEET JOB NO. SR 5.6-A12-1

Thu Feb 15 13:21:26 2007



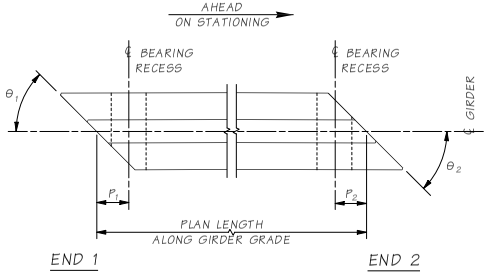
STRAND PATTERN AT GIRDER END

HARPED STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



STRAND PATTERN AT ℄ SPAN

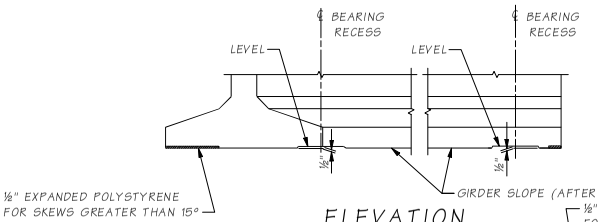
STRAIGHT STRAND LOCATION SEQUENCE SHALL BE AS SHOWN (1), (2) ETC.



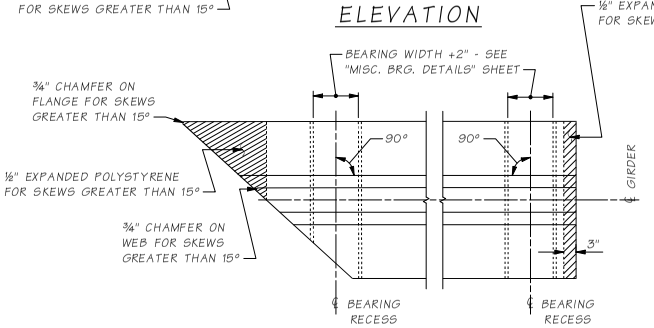
GIRDER SCHEDULE

DIMENSION "A" AT ℄ BEARINGS = BASED ON GIRDER DEFLECTION = "D" AT TIME OF SLAB PLACEMENT (120 DAYS)

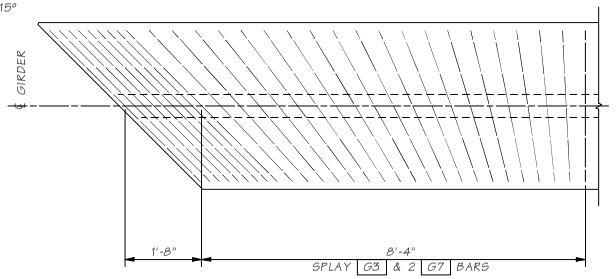
SPAN	GIRDER	END 1 TYPE	END 2 TYPE	L	θ1	θ2	P1	P2	PLAN LENGTH (ALONG GIRDER GRADE)	MIN. CONC. COMP. STRENGTH @ FINAL F'c (KSI)	MIN. CONC. COMP. STRENGTH @ RELEASE F'ci (KSI)	HARPED NO. OF STRANDS	HARPED JACKING FORCE (KIPS)	STRAIGHT NO. OF STRANDS	STRAIGHT JACKING FORCE (KIPS)	TEMPORARY NO. OF STRANDS	TEMPORARY JACKING FORCE (KIPS)	LOCATION OF C.G. STRANDS (IN.) E	F℄	Fb	Fo	C (IN.)	D @ 40 DAYS (IN.)	D @ 120 DAYS (IN.)	Ld (IN.)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



ELEVATION

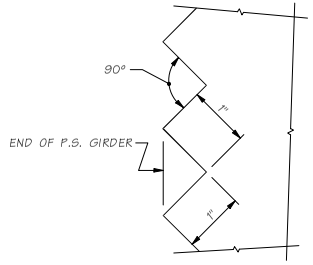


PLAN - BEARING RECESS AND BOTTOM FLANGE SPALL PROTECTION DETAIL



TRANSVERSE REINFORCING SKEWED ENDS

ONLY TRANSVERSE REINF. SHOWN



SAWTOOTH DETAILS

SAWTEETH ARE FULL WIDTH - USE SAWTOOTH KEYS FROM BOTTOM OF BOTTOM FLANGE TO BOTTOM OF LOWEST HARPED STRAND AS WELL AS TOP FLANGE ADJACENT TO HARPED STRANDS AS SHOWN IN VIEW B - WF95G GIRDER DETAILS 1 OF 3

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G2.man								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

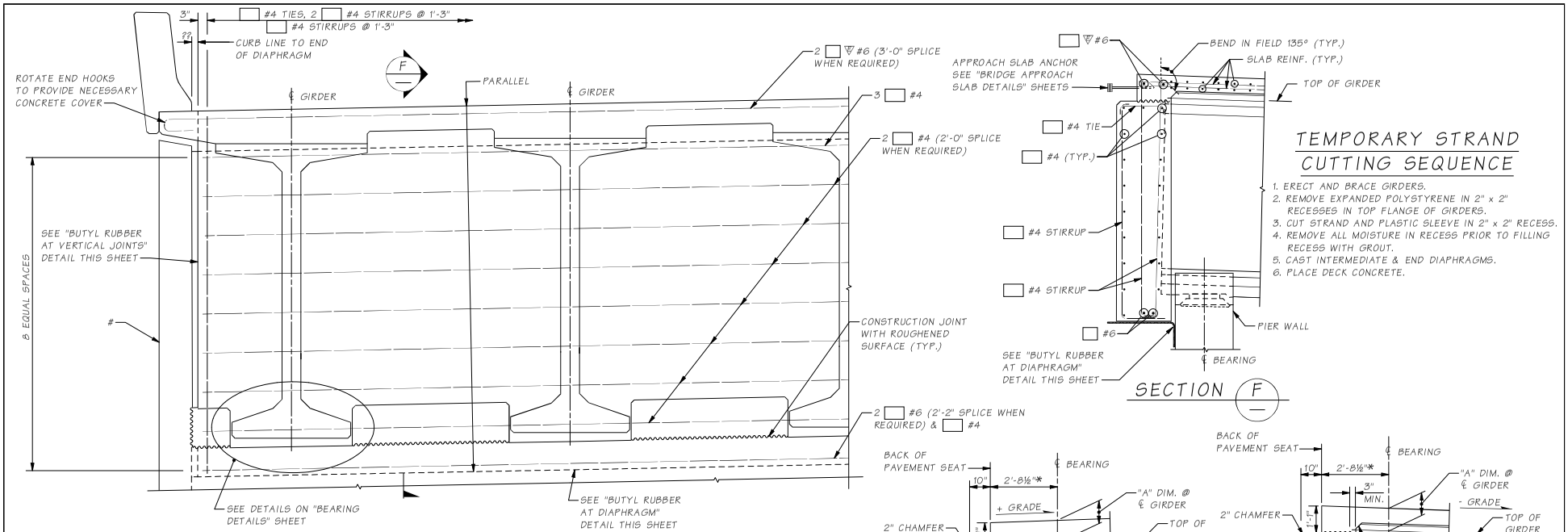
STANDARD PRESTRESSED CONCRETE GIRDERS

WF95G GIRDER DETAILS 2 OF 3

BRIDGE SHEET NO. | SHEET | OF | SHEETS

SR ____ SHEET ____ JOB NO. 5.6-A12-2

Thu Feb 15 13:21:19 2007



ELEVATION
END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM

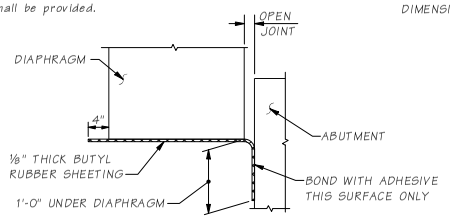
TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.

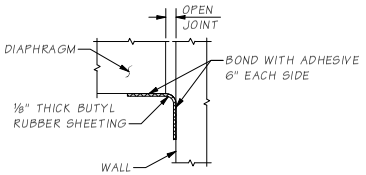
SECTION F

NOTE TO DESIGNER

If ground line is less than 2'-0" minimum below the bottom of girder at front face of abutment a curtain wall shall be provided.



ELEVATION BUTYL RUBBER AT DIAPHRAGM

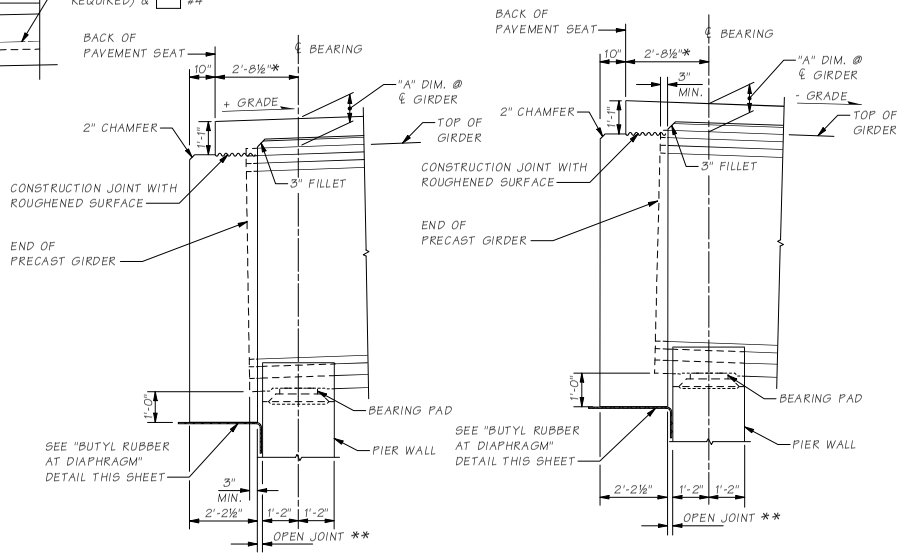


PLAN BUTYL RUBBER AT VERTICAL JOINTS

Bridge length	Open Joint
L ≤ 200	** = 1.5 IN.
200 < L ≤ 300	** = 2.0 IN.
300 < L ≤ 400	** = 2.5 IN.
L > 400	Special design

* Revise based on size of Open Joint

NOTE:
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED.



END DIAPHRAGM GEOMETRY

SECTIONS THROUGH END DIAPHRAGMS AT END PIERS SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A". ALL LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G_END_DIA_ON_GIR.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

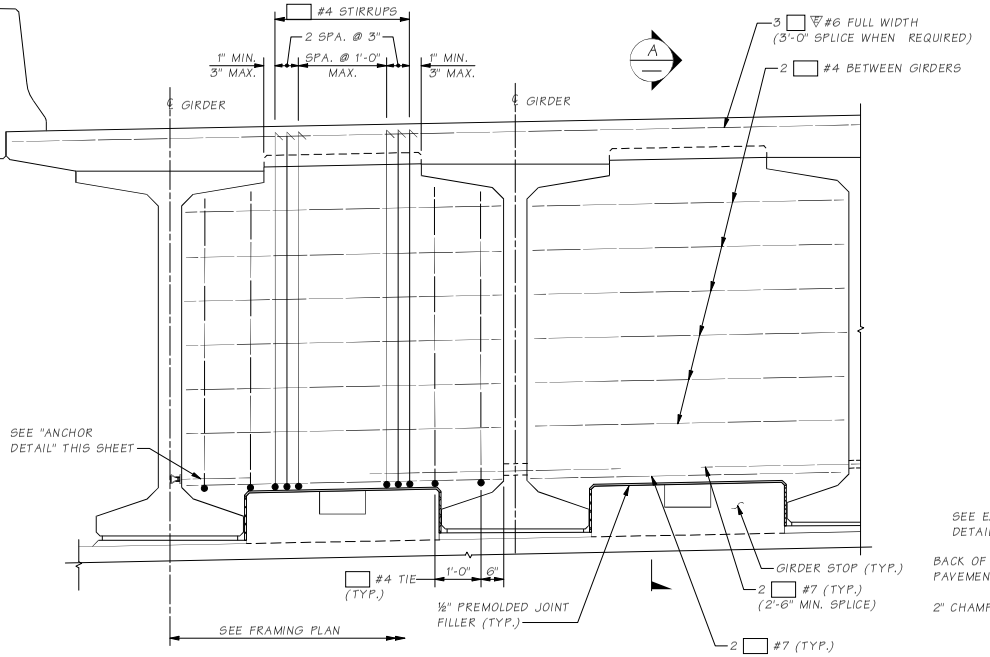
WF95G END DIAPHRAGM ON GIRDER DETAILS

BRIDGE SHEET NO. SHEET OF SHEETS

SR JOB NO. SHEET

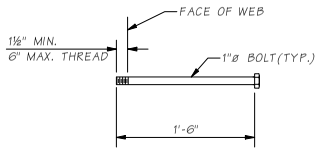
5.6-A12-3

Thu Feb 15 13:21:09 2007



ELEVATION END DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



ANCHOR DETAIL

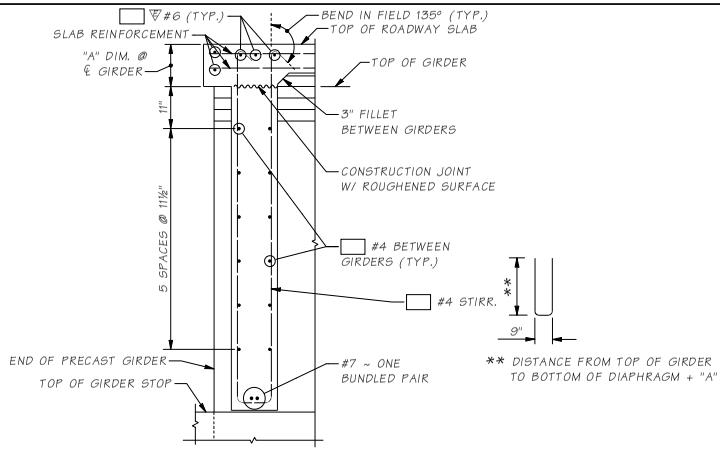
ASTM A-307

NOTE:

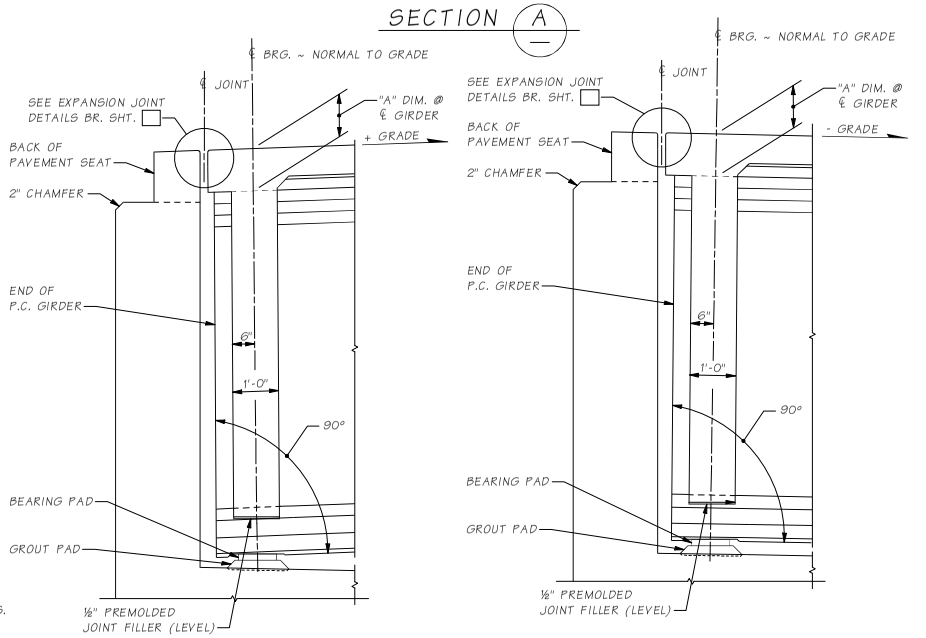
GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

TEMPORARY STRAND CUTTING SEQUENCE

1. ERECT AND BRACE GIRDERS.
2. REMOVE EXPANDED POLYSTYRENE IN 2" x 2" RECESSES IN TOP FLANGE OF GIRDERS.
3. CUT STRAND AND PLASTIC SLEEVE IN 2" x 2" RECESS.
4. REMOVE ALL MOISTURE IN RECESS PRIOR TO FILLING RECESS WITH GROUT.
5. CAST INTERMEDIATE & END DIAPHRAGMS.
6. PLACE DECK CONCRETE.



SECTION A



ROADWAY EXPANSION JOINT AT END PIERS

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
GIRDER STOP NOT SHOWN FOR CLARITY.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G_ABUT_PIER_DIAPH_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

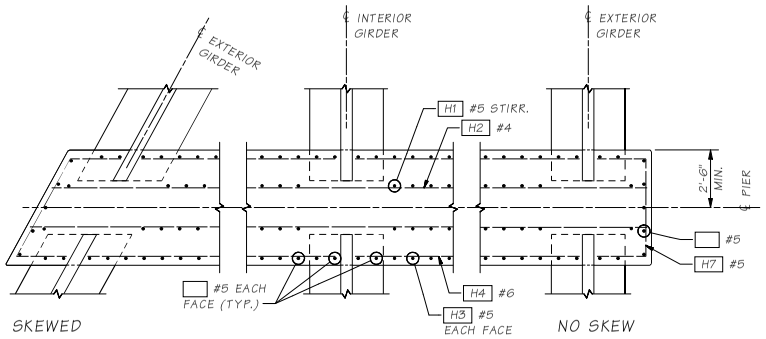
STANDARD PRESTRESSED CONCRETE GIRDERS

WF95G ABUTMENT TYPE PIER DIAPHRAGM DETAILS

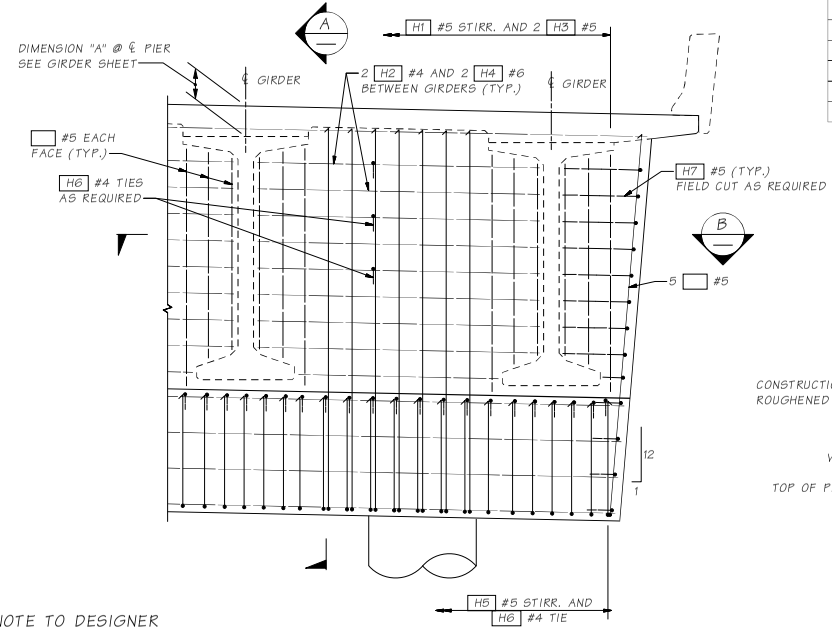
BRIDGE SHEET NO. — SHEET — OF — SHEETS

JOB NO. — SHEET — GR — 5.6-A12-4

Thu Feb 15 13:21:15 2007



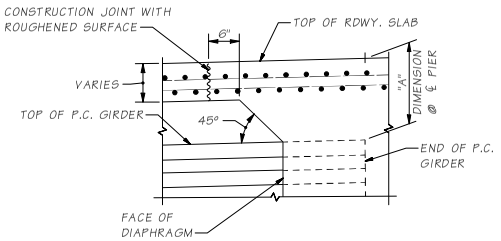
SECTION B



ELEVATION

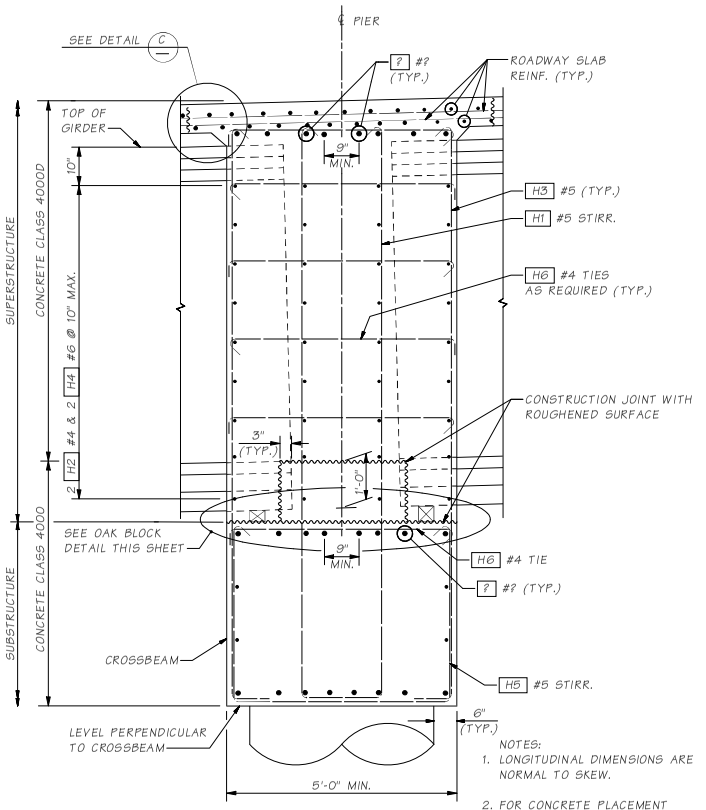
ELEVATION AT TOP OF OAK BLOCK

GIRDER	PIER ?	
	BACK STATION	AHEAD STATION



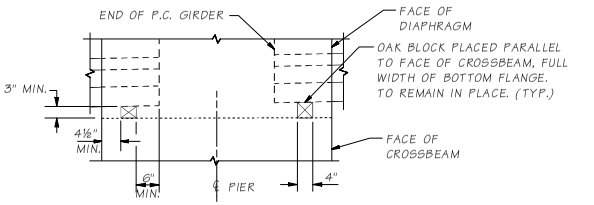
DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.

SECTION A



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.

Bridge Design Engr.	M:\STANDARDS\Girders\WF 1-Girders\W95G\W95G_FIX_FLUSH_FACE_INTER_PIER_DIAPH_DET.MAN							
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

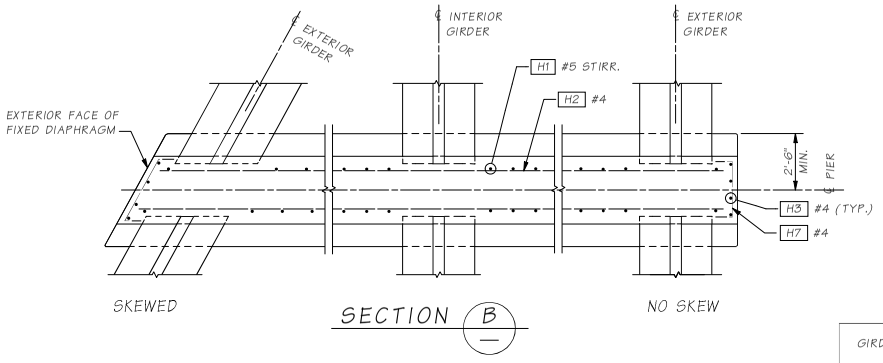
WF95G FIXED FLUSH-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

SR. JOB NO. SHEET 5.6-A12-5

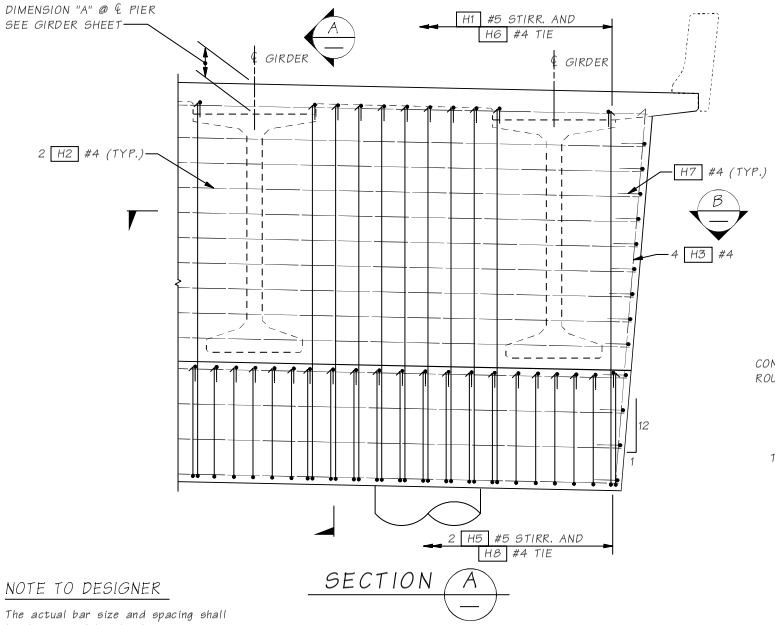
Thu Feb 15 13:21:05 2007



SECTION B

ELEVATION AT TOP OF OAK BLOCK

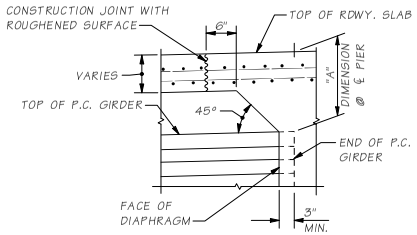
GIRDER	PIER ?	
	BACK STATION	AHEAD STATION



SECTION A

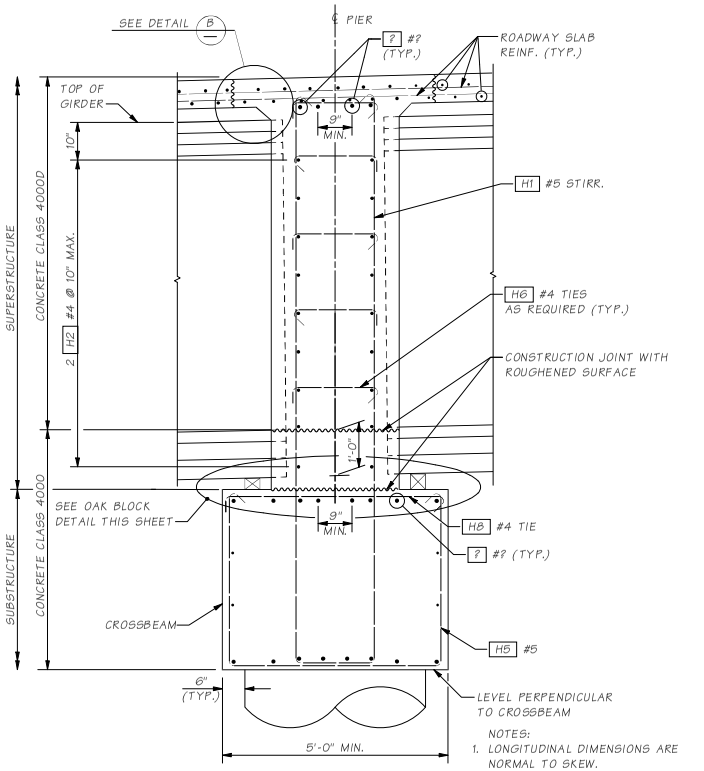
NOTE TO DESIGNER

The actual bar size and spacing shall be determined by the designer.



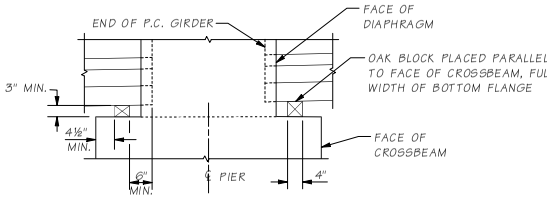
DETAIL C

DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY



SECTION A

NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQEUNCE" SHEET.



OAK BLOCK DETAIL

LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW

SHEET ____ JOB NO. ____ SR. 5.6-A12-6

Bridge Design Engr.	M:\STANDARDS\Girders\WF 1-Girders\WF95G\WF95G_FIX_RECESSED_FACE_INTER_PIER_DIAPH_DET.MAN								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

Thu Feb 15 13:20:59 2007

BRIDGE AND STRUCTURES OFFICE

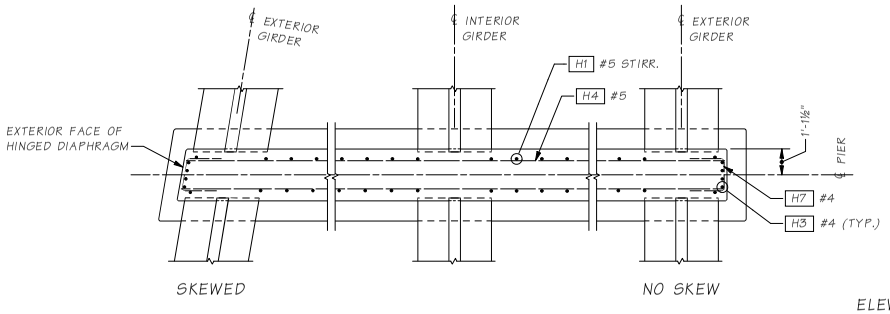
Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

WF95G FIXED RECESSED-FACE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

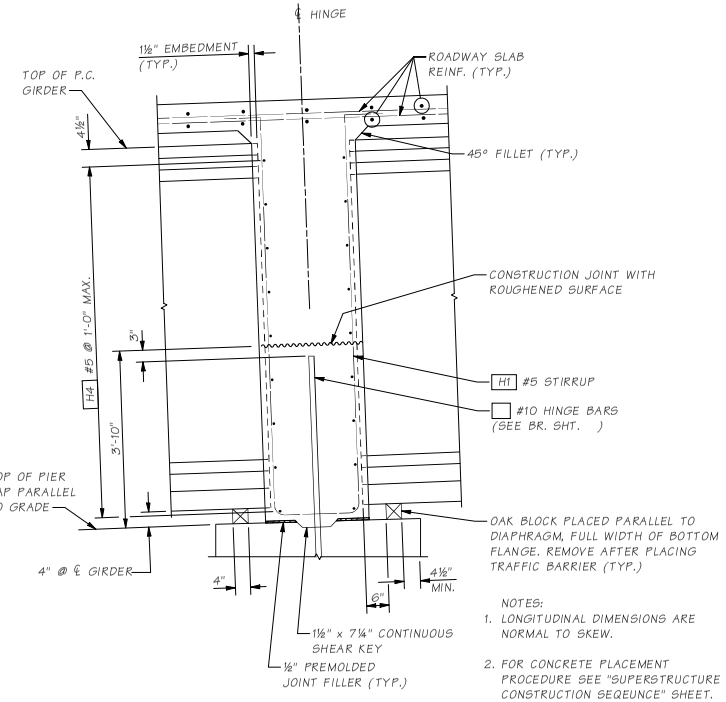
SHEET OF SHEETS



SECTION B

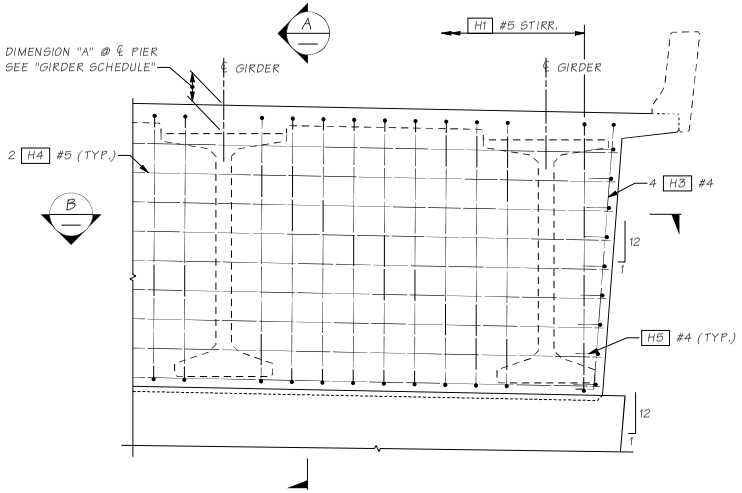
ELEVATION AT TOP OF OAK BLOCK

GIRDER	PIER ?	
	BACK STATION	AHEAD STATION

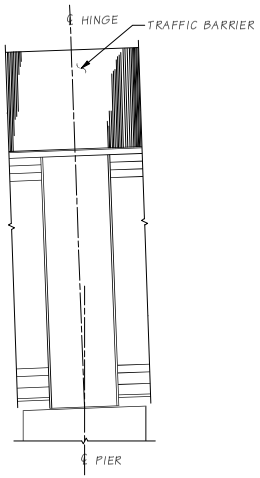


SECTION A

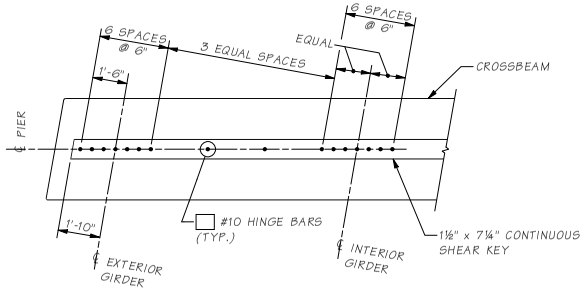
NOTES:
1. LONGITUDINAL DIMENSIONS ARE NORMAL TO SKEW.
2. FOR CONCRETE PLACEMENT PROCEDURE SEE "SUPERSTRUCTURE CONSTRUCTION SEQUENCE" SHEET.
3. EXTENDED STRANDS AND GIRDER REINFORCING NOT SHOWN FOR CLARITY.



ELEVATION



END VIEW
HINGE DIAPHRAGM



HINGE BAR PLAN

Hinge bar plan is shown for designer. The actual hinge bars detail shall be shown on the crossbeam details sheet.

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G_HINGE_DIAPHRAGM_INTER_PIER_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

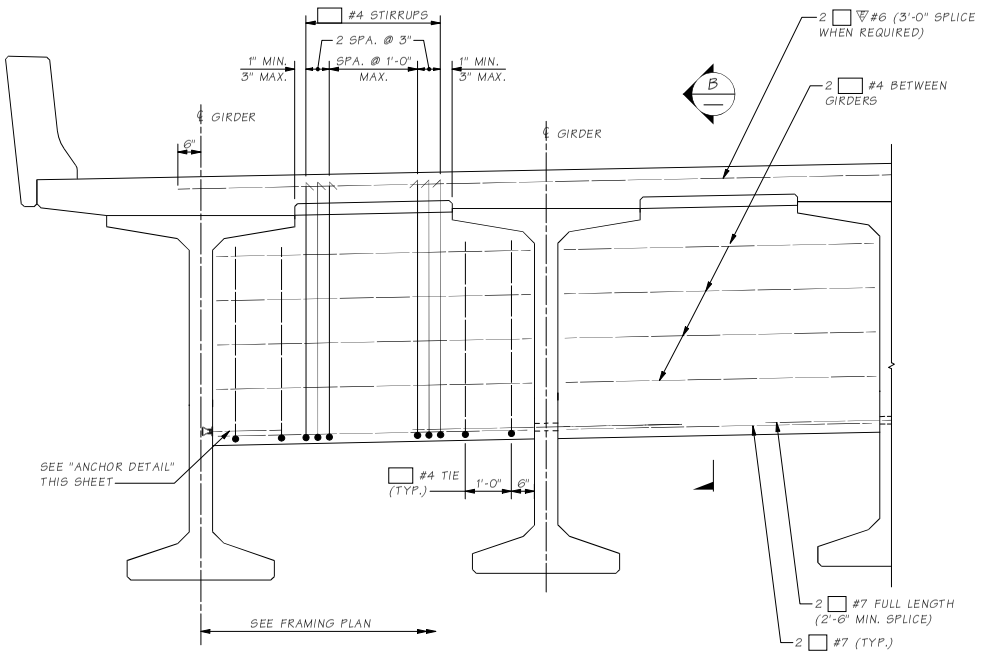
WF95G HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS

BRIDGE SHEET NO.

SHEET OF SHEETS

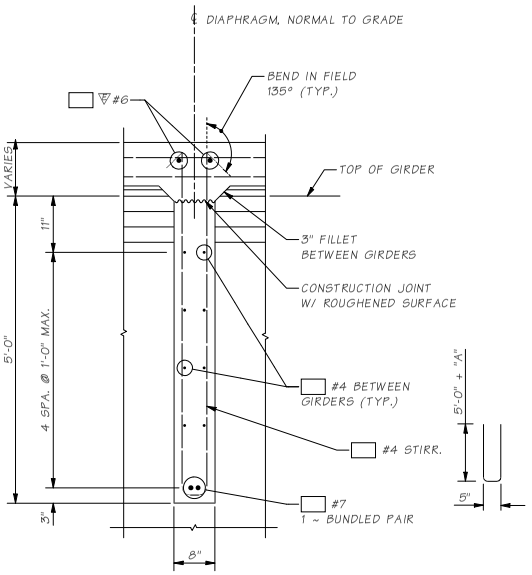
SR JOB NO. SHEET 5.6-A12-7

Thu Feb 15 13:20:54 2007

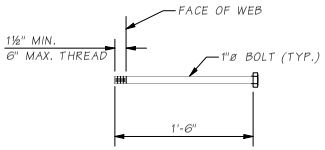


ELEVATION
INTERMEDIATE DIAPHRAGM

DIMENSIONS ARE ALONG DIAPHRAGM



SECTION B



ANCHOR DETAIL

ASTM A-307

NOTE:

GIRDERS SHALL BE HELD RIGIDLY IN PLACE WHEN DIAPHRAGMS ARE PLACED. REINFORCING BAR SHALL BE THREADED THROUGH HOLES IN GIRDERS PRIOR TO PLACING OF EXTERIOR GIRDERS. SEE "GIRDER DETAILS" SHEET FOR DIMENSION "A".

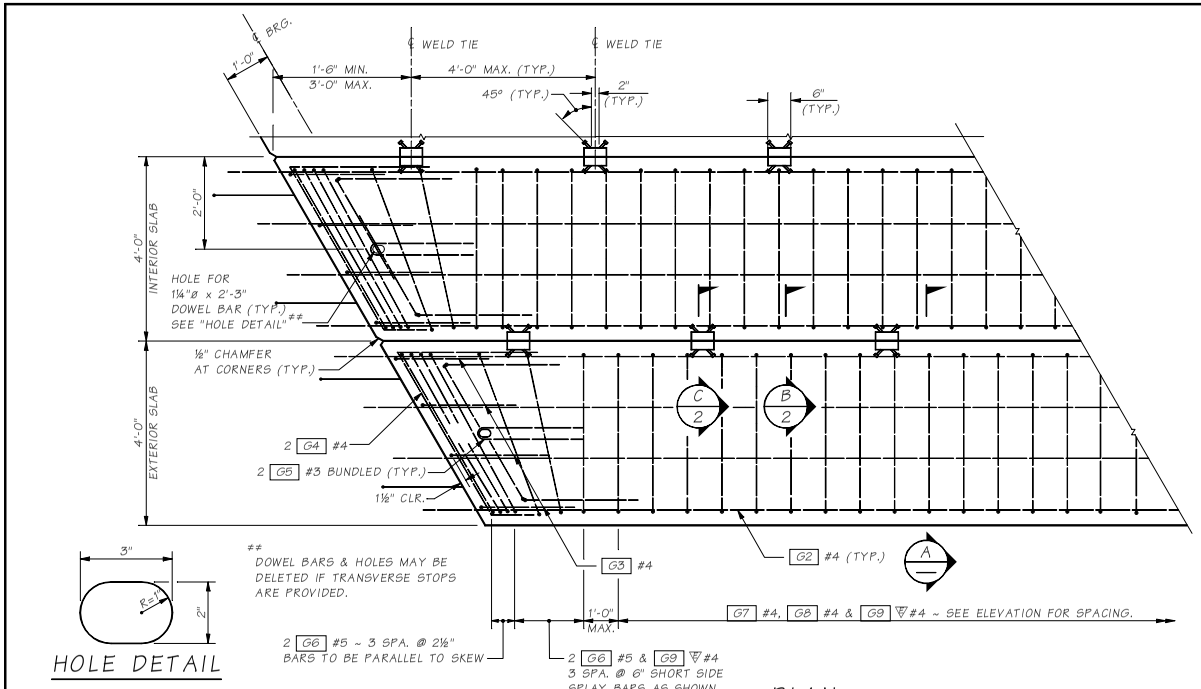
SHEET ____ JOB NO. ____ SR ____

5.6-A12-8

Bridge Design Engr.	M:\STANDARDS\Girders\WF I-Girders\W95G\W95G_INTER_DIAPHRAGM_DET.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor					10	WASH				Washington State Department of Transportation
Designed By					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDERS
Checked By										WF95G INTERMEDIATE DIAPHRAGM DETAILS
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

BRIDGE SHEET NO. ____ SHEET ____ OF ____ SHEETS

Thu Feb 15 13:21:31 2007

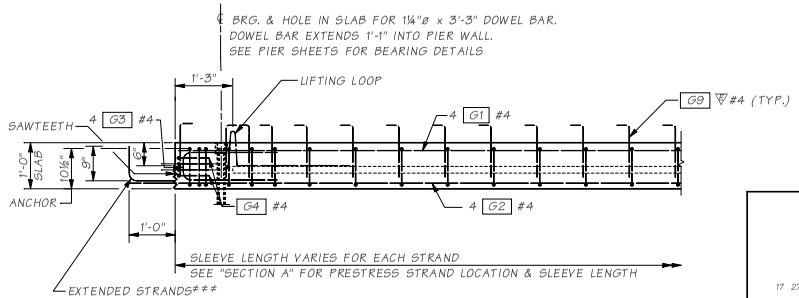


HOLE DETAIL

DOWEL BARS & HOLES MAY BE DELETED IF TRANSVERSE STOPS ARE PROVIDED.

PLAN

SHOWN FOR SKEW ANGLE GREATER THAN OR EQUAL TO 20° (30° MAX.)



ELEVATION

EXTEND STRANDS 3 & 4 AT END AHEAD ON STATION. EXTEND STRANDS 5 & 6 END BACK ON STATION.

NOTES TO DESIGNER

STRAND SEQUENCE

1	3	4	2
17 27 21	25 29 19 23 31	32 24 20 30 26	22 28 18
1 9 3	11 5 13 7 15	16 8 14 6 12	4 10 2

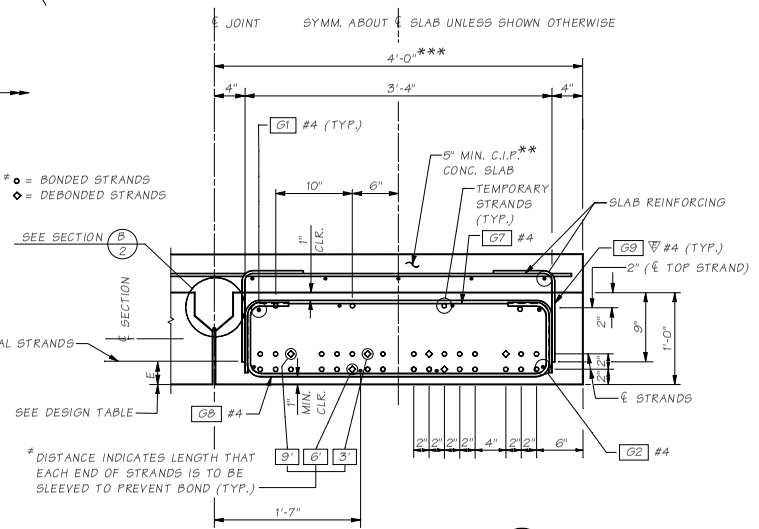
WHEN DEBONDED STANDS ARE REQUIRED, PLACE AT INTERIOR STRAND LOCATION (WITHIN SECOND ROW IF POSSIBLE).

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL PRESTRESSING STEEL SHALL BE ½"ø OR 0.6"ø LOW-RELAXATION STRANDS (AASHTO M203 GRADE 270).
3. CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRAND
6. ALL REINFORCING STEEL SPLICES SHALL BE 2'-0" MINIMUM, UNLESS SHOWN OTHERWISE.
7. ALL REINFORCING BARS SHALL BE PLACED 2" FROM NEAREST FACE OF CONCRETE UNLESS SHOWN OTHERWISE.
8. NO TRAFFIC SHALL BE ALLOWED UNTIL THE C-I-P SLAB CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 4000 PSI.
9. TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 7'-6" OF THE SLAB LENGTH. TEMPORARY STRANDS SHALL BE CUT AFTER ALL VOIDED SLABS ARE ERECTED, BUT BEFORE C-I-P CONCRETE SLAB IS CAST.

** CLASS 4000D CONCRETE WITH ONE LAYER OF #4 EPOXY COATED REINFORCEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION SPACE AT 1'-0" MAX.

*** PRECAST SLAB WIDTH MAY VARY TO MATCH BRIDGE GEOMETRY (8'-0" MAX.)



SECTION A — EXTERIOR SLAB

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCPS 12 INCH SLAB 1.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE SHEET NO.
Supervisor										
Designed By					10	WASH.				
Checked By										SHEET
Detailed By					JOB NUMBER					OF
Bridge Projects Engr.										SHEETS
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APPD						

BRIDGE AND STRUCTURES OFFICE

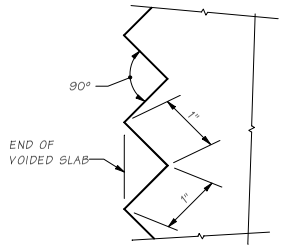
Washington State Department of Transportation

PRESTRESSED CONCRETE GIRDERS

1'-0" SOLID SLAB
DETAILS 1 OF 2

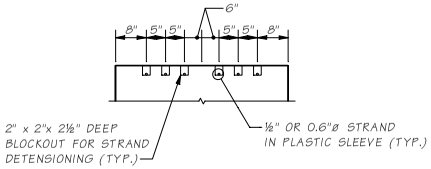
SR ___ JOB NO. 5.6-A19-1 ___ SHEET

Thu Jan 11 11:52:17 2007

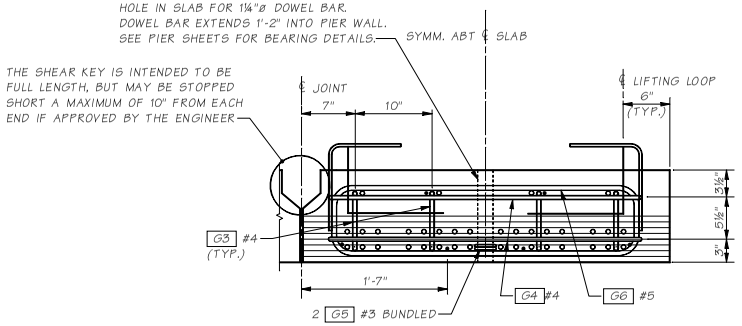


SAWTOOTH DETAILS

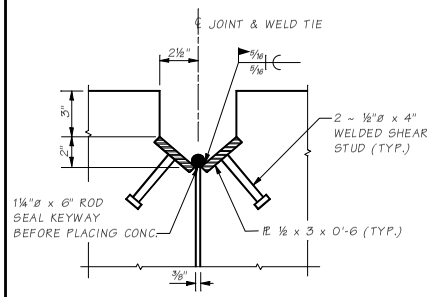
SAWTEETH ARE FULL WIDTH



TEMPORARY STRAND BLOCKOUT DETAIL

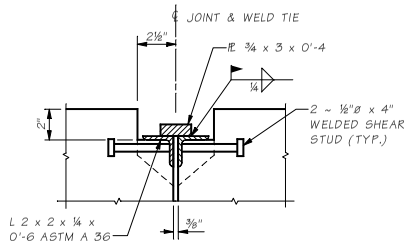


END VIEW EXTERIOR SLAB



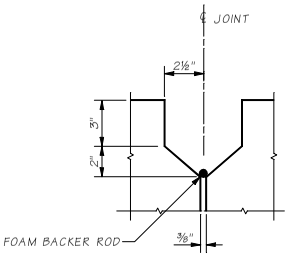
SECTION C 2

WELD TIE ALTERNATE #1

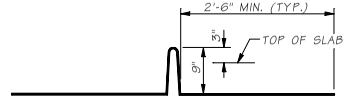


SECTION C 2

WELD TIE ALTERNATE #2

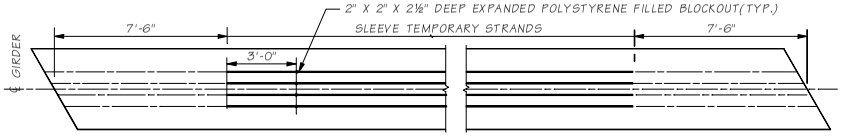


SECTION B 2



DEVELOPED ELEVATION LIFTING LOOP

MINIMUM OF 8 STRANDS PER SLAB.



PLAN VIEW OF TEMPORARY STRANDS

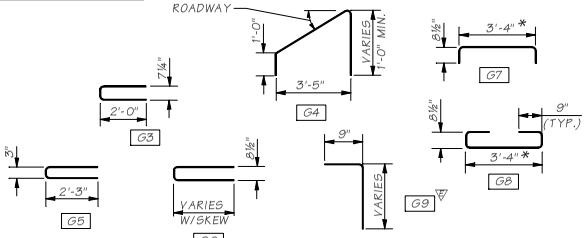
BARLIST

ALL REINFORCING SHALL BE ASTM A 706

MARK	LOCATION	SIZE	NO. REQ'D
G1	SLAB LONGIT. - TOP	4	4 β STR.
G2	SLAB LONGIT. - BOT.	4	4 STR.
G3	END OF SLAB - TIE	4	8
G4	END OF SLAB - TIE	4	4
G5	END OF SLAB - TIE	3	4 δ
G6	END OF SLAB - TIE	5	AS REQ'D BY SKEW
G7	SLAB TRANSV. - TIE	4	VARIES WITH SPAN
G8	SLAB TRANSV. - STIRRUP	4	VARIES WITH SPAN
G9	SLAB VERTICAL - TOP	4δ	VARIES WITH SPAN

δ 2 BARS BUNDLED

β ADDITIONAL BARS WILL BE REQUIRED ON VOIDED SLABS W/BARRIERS, IF OPTION 1 ANCHOR PLATE DETAIL IS SELECTED.



* VARIES FOR SKEW END

DESIGN TABLE

SPAN NUMBER	SPAN LENGTH ℄/℄ BRG. FT.	SLAB NUMBER	STRENGTH OF CONCRETE @ FINAL F'C (KSI)	STRENGTH OF CONCRETE @ RELEASE F'CI (KSI)	BOTTOM STRANDS NO. OF DEBOND STRANDS	BOTTOM STRANDS NO. OF BONDED STRANDS	BOTTOM STRANDS JACKING FORCE (KIPS)	TOP TEMP STRANDS NO. OF STRANDS	TOP TEMP STRANDS JACKING FORCE (KIPS)	LOCATION OF C.G. OF BOTTOM STRAND "E" IN.	CAMBER (IN.) C	CAMBER (IN.) D 40	CAMBER (IN.) D 120

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\FCPS 12 INCH SLAB 2.man			REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor				10	WASH.			
Designed By				JOB NUMBER				
Checked By								
Detailed By								
Bridge Projects Engr.								
Prelim. Plan By								
Architect/Specialist	DATE	REVISION	BY	APP'D				

Thu Jan 11 11:52:11 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

PRESTRESSED CONCRETE GIRDERS

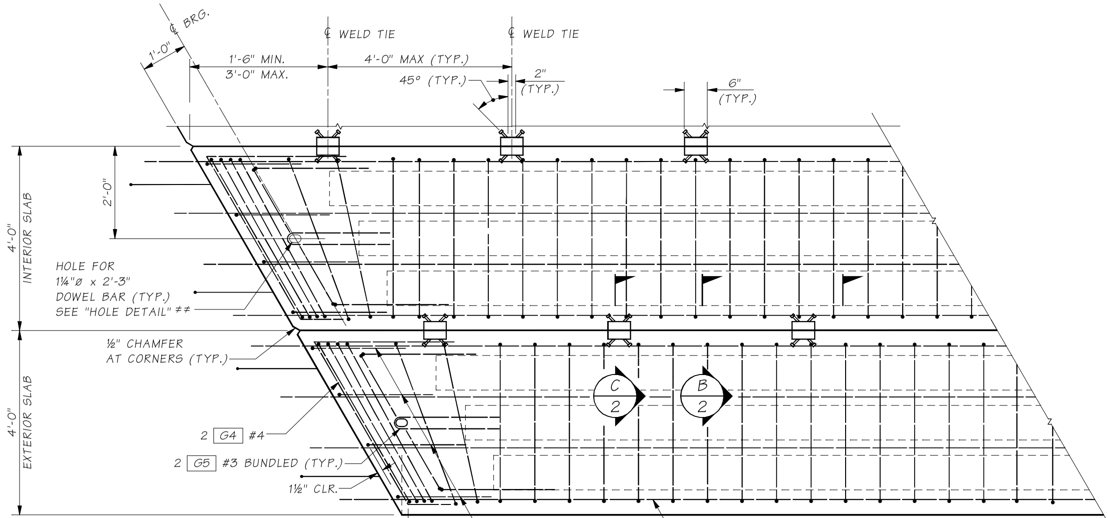
1'-0" SOLID SLAB DETAILS 2 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

SHEET JOB NO. SR

5.6-A19-2



PLAN

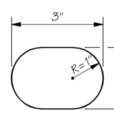
SHOWN FOR SKEW ANGLE GREATER THAN OR EQUAL TO 20° (30° MAX.)

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL PRESTRESSING STEEL SHALL BE ½"ø OR 0.6"ø LOW-RELAXATION STRANDS (AASHTO M203 GRADE 270).
3. CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRAND
6. ALL REINFORCING STEEL SPLICES SHALL BE 2'-0" MINIMUM, UNLESS SHOWN OTHERWISE.
7. ALL REINFORCING BARS SHALL BE PLACED 2" FROM NEAREST FACE OF CONCRETE UNLESS SHOWN OTHERWISE.
8. NO TRAFFIC SHALL BE ALLOWED UNTIL THE C-I-P SLAB CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 4000 PSI.
9. TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 7'-6" OF THE SLAB LENGTH. TEMPORARY STRANDS SHALL BE CUT AFTER ALL VOIDED SLABS ARE ERECTED, BUT BEFORE C-I-P CONCRETE SLAB IS CAST.

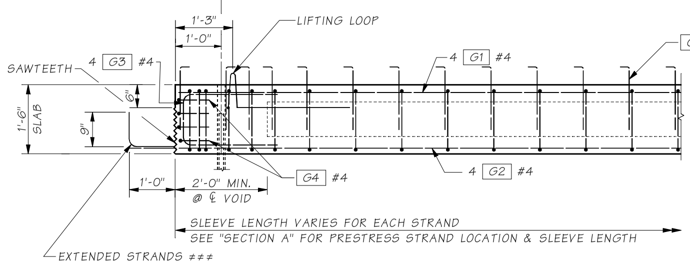
** CLASS 4000D CONCRETE WITH ONE LAYER OF #4 EPOXY COATED REINFORCEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION SPACE AT 1'-0" MAX.

*** PRECAST SLAB WIDTH MAY VARY TO MATCH BRIDGE GEOMETRY (8'-0" MAX.)



HOLE DETAIL

DOWEL BARS & HOLES MAY BE DELETED IF TRANSVERSE STOPS ARE PROVIDED.



ELEVATION

EXTEND STRANDS 3 & 4 AT END AHEAD OF STATION.
EXTEND STRANDS 5 & 6 AT END BACK ON STATION.

NOTES TO THE DESIGNER

STRAND SEQUENCE

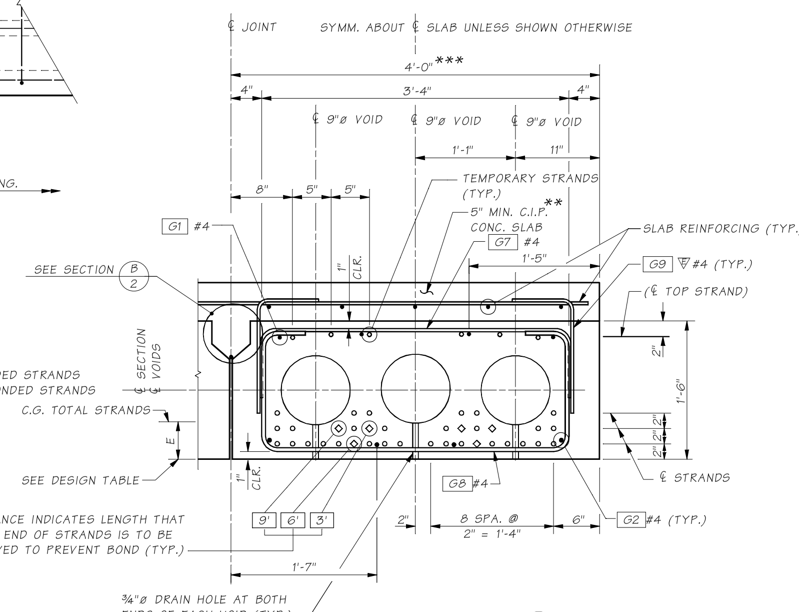
1 5 3 4 6 2

31 35 33 34 36 32

19 25 21 27 23 29 30 24 28 22 26 20

1 11 3 13 5 15 7 17 9 10 18 8 16 6 14 4 12 2

WHEN DEBONDED STANDS ARE REQUIRED, PLACE AT INTERIOR STRAND LOCATION (WITHIN SECOND ROW IF POSSIBLE).



SECTION A

EXTERIOR SLAB

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCPS 18 INCH SLAB 1.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	
Supervisor					10	WASH.				
Designed By					JOB NUMBER					
Checked By										
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

PRESTRESSED CONCRETE GIRDERS

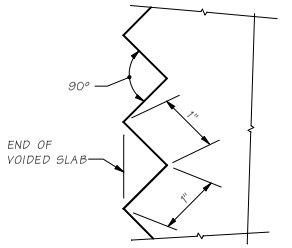
1'-6" VOIDED SLAB DETAILS 1 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

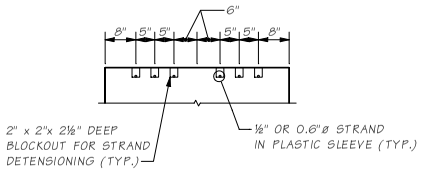
Thu Jan 11 11:52:05 2007

SR JOB NO. SHEET

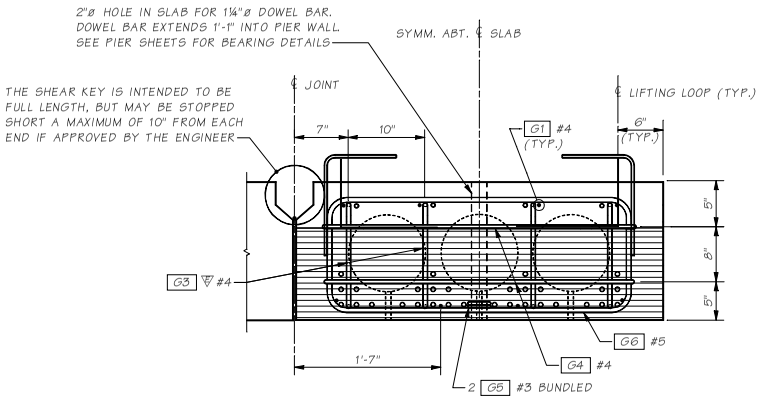


SAWTOOTH DETAILS

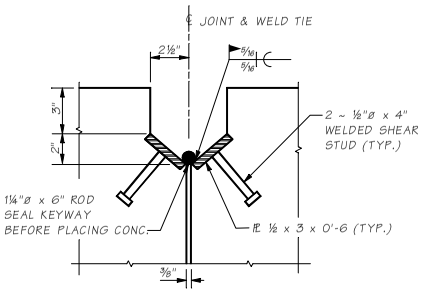
SAWTEETH ARE FULL WIDTH



TEMPORARY STRAND BLOCKOUT DETAIL

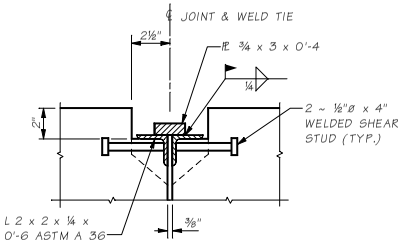


END VIEW EXTERIOR SLAB



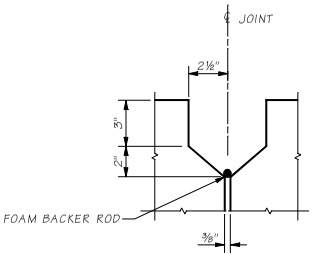
SECTION C 2

WELD TIE
ALTERNATE #1

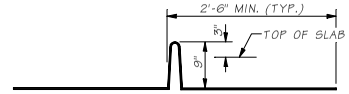


SECTION C 2

WELD TIE
ALTERNATE #2

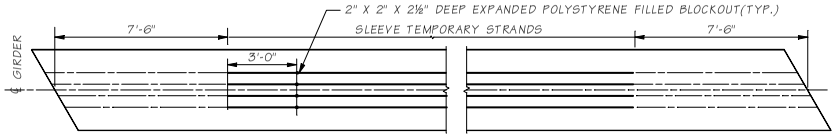


SECTION B 2



DEVELOPED ELEVATION LIFTING LOOP

MINIMUM OF 8 STRANDS PER SLAB.



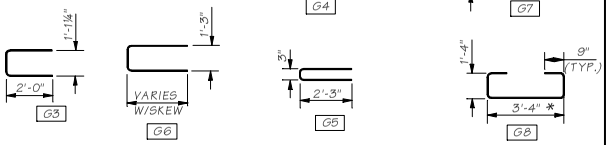
PLAN VIEW OF TEMPORARY STRANDS

BARLIST

ALL REINFORCING SHALL BE ASTM A 706

MARK	LOCATION	SIZE	NO. REQ'D	
G1	LONGIT. - TOP	4	4	STR.
G2	LONGIT. - BOT.	4	4	STR.
G3	END OF TIE	4	8	
G4	END OF TIE	4	4	
G5	END OF TIE	3	4	
G6	END OF TIE	5	AS REQ'D BY SKEW	
G7	TRANSV. - TIE	4	VARIES WITH SPAN	
G8	TRANSV. - STIRRUP	4	VARIES WITH SPAN	
G9	VERTICAL - TOP	4@	VARIES WITH SPAN	

* VARIES FOR SKEW ENDS



DESIGN TABLE

SPAN NUMBER	SPAN LENGTH ℄/℄ BRG. (FT.)	SLAB NUMBER	STRENGTH OF CONCRETE		BOTTOM STRANDS			TOP TEMPORARY STRANDS		LOCATION OF C.G. OF BOTTOM STRAND "E" (IN.)	CAMBER (IN.)		
			@ FINAL F'_c (KSI)	@ RELEASE F'_{ci} (KSI)	NO. OF DEBOND STRANDS	NO. OF BONDED STRANDS	JACKING FORCE (KIPS)	NO. OF STRANDS	JACKING FORCE (KIPS)		C	D_{40}	D_{120}

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCPS 18 INCH SLAB 2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Jan 11 11:51:59 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

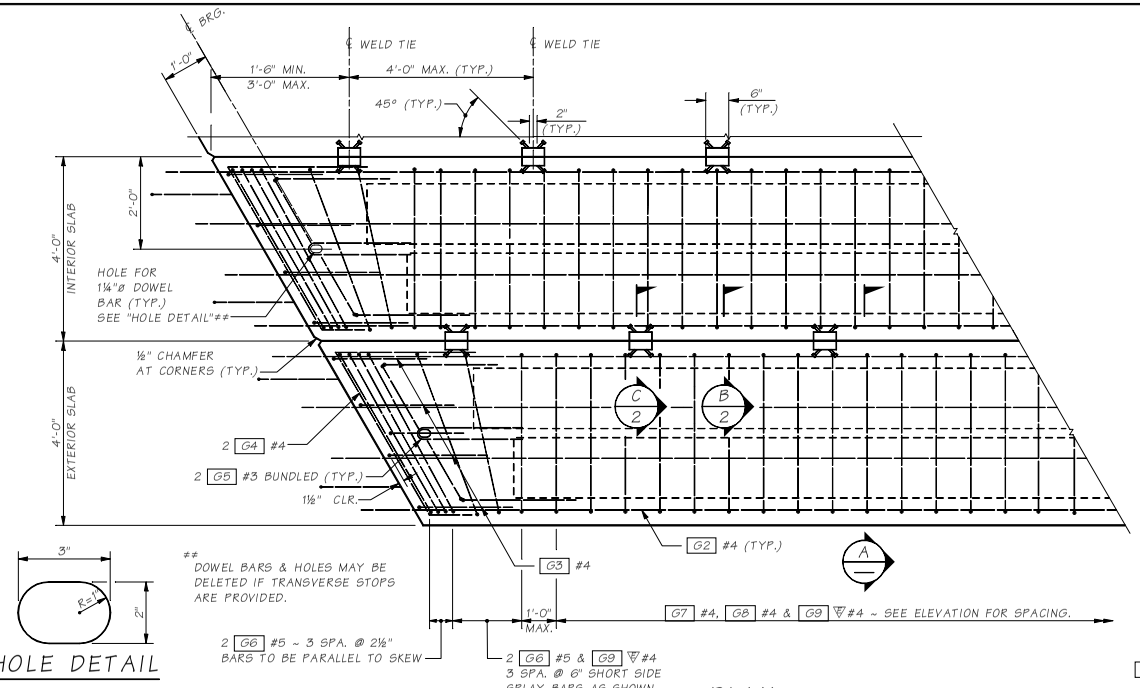
STANDARD PRESTRESSED CONCRETE GIRDERS

1'-6" VOIDED SLAB DETAILS 2 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

SHEET JOB NO. SR 5.6-A20-2



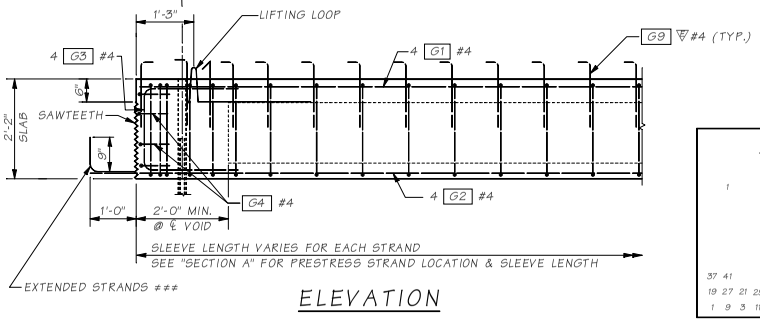
PLAN

SHOWN FOR SKEW ANGLE GREATER THAN OR EQUAL TO 20° (30° MAX.)

HOLE DETAIL

DOWEL BARS & HOLES MAY BE DELETED IF TRANSVERSE STOPS ARE PROVIDED.

℄ BRG. & HOLE IN SLAB FOR 1¼"ø x 3'-3" DOWEL BAR. DOWEL BAR EXTENDS 1'-1" INTO PIER WALL. SEE PIER SHEETS FOR BEARING DETAILS



ELEVATION

EXTEND STRANDS 3 & 4 AT END AHEAD OF STATION. EXTEND STRANDS 5 & 6 AT END BACK ON STATION.

NOTES TO DESIGNER

STRAND SEQUENCE

1		5		3				4		6		2							
37	41				39		40						42	38					
19	27	21	29	35	23	31	25	33	34	26	32	24	36	30	22	28	20		
1	9	3	11	17	5	13	7	15	16	8	14	6	18	12	4	10	2		

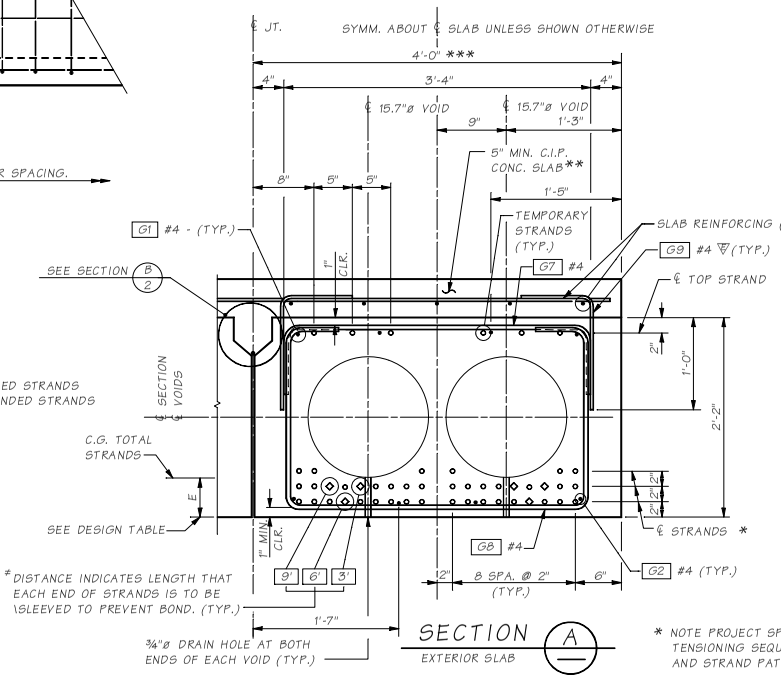
WHEN DEBONDED STANDS ARE REQUIRED, PLACE AT INTERIOR STRAND LOCATION (WITHIN SECOND ROW IF POSSIBLE).

NOTES

1. PLAN LENGTH SHALL BE INCREASED AS NECESSARY TO COMPENSATE FOR SHORTENING DUE TO PRESTRESS AND SHRINKAGE.
2. ALL PRESTRESSING STEEL SHALL BE ½"ø OR 0.6"ø LOW-RELAXATION STRANDS (AASHTO M203 GRADE 270).
3. CUT ALL STRANDS FLUSH WITH THE GIRDER ENDS AND PAINT WITH AN APPROVED EPOXY RESIN, EXCEPT FOR EXTENDED STRANDS AS SHOWN.
4. THE TOP SURFACE OF THE GIRDER FLANGE SHALL BE ROUGHENED IN ACCORDANCE WITH SECTION 6-02.3(25)H OF THE STANDARD SPECIFICATIONS.
5. IF THE LIFTING LOOPS EXTEND WITHIN 3" OF THE TOP OF THE ROADWAY SLAB, THEY SHALL BE CUT OFF PRIOR TO PLACING THE ROADWAY SLAB. ALL LIFTING STRANDS SHALL BE OF THE SAME MATERIAL AND STRENGTH AS THE PRESTRESSING STRAND
6. ALL REINFORCING STEEL SPLICES SHALL BE 2'-0" MINIMUM, UNLESS SHOWN OTHERWISE.
7. ALL REINFORCING BARS SHALL BE PLACED 2" FROM NEAREST FACE OF CONCRETE UNLESS SHOWN OTHERWISE.
8. NO TRAFFIC SHALL BE ALLOWED UNTIL THE C-I-P SLAB CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 4000 PSI.
9. TEMPORARY STRANDS SHALL BE UNBONDED OVER ALL BUT THE END 7'-6" OF THE SLAB LENGTH. TEMPORARY STRANDS SHALL BE CUT AFTER ALL VOIDED SLABS ARE ERECTED, BUT BEFORE C-I-P CONCRETE SLAB IS CAST.

** CLASS 4000D CONCRETE WITH ONE LAYER OF #4 EPOXY COATED REINFORCEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION SPACE AT 1'-0" MAX.

*** PRECAST SLAB WIDTH MAY VARY TO MATCH BRIDGE GEOMETRY (8'-0" MAX.)



SECTION A

EXTERIOR SLAB

\# ○ = BONDED STRANDS
◇ = DEBONDED STRANDS

DISTANCE INDICATES LENGTH THAT EACH END OF STRANDS IS TO BE \SLEEVED TO PREVENT BOND. (TYP.)

* NOTE PROJECT SPECIFIC TENSIONING SEQUENCE AND STRAND PATTERN

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCFS 26 VOIDED SLAB 1.man								
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By					10	WASH.			
Checked By					JOB NUMBER				
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Jan 11 11:51:53 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

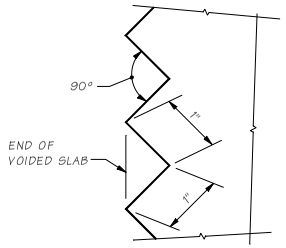
2'-2" VOIDED SLAB DETAILS 1 OF 2

BRIDGE SHEET NO.

SHEET OF SHEETS

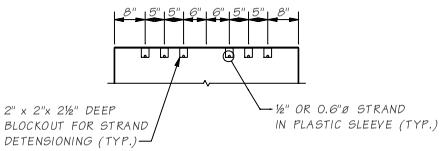
SR ____ JOB NO. ____ SHEET

5.6-A21-1

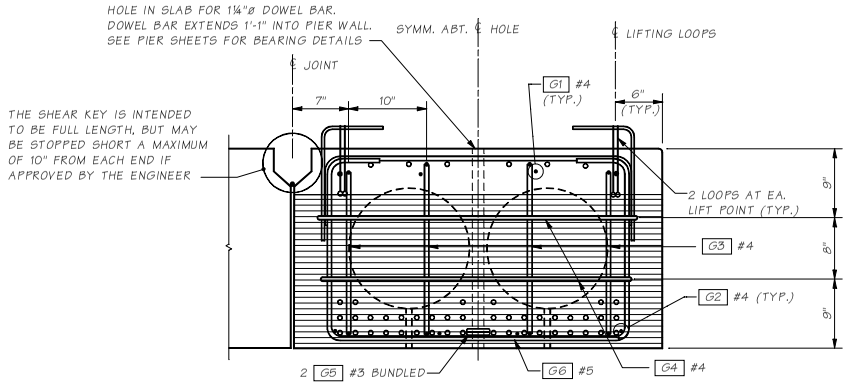


SAWTOOTH DETAILS

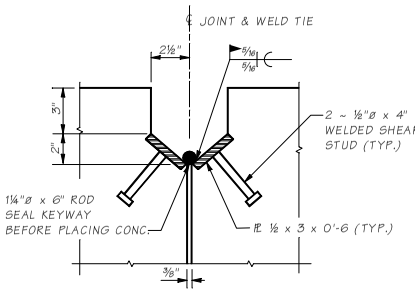
SAWTEETH ARE FULL WIDTH



TEMPORARY STRAND BLOCKOUT DETAIL

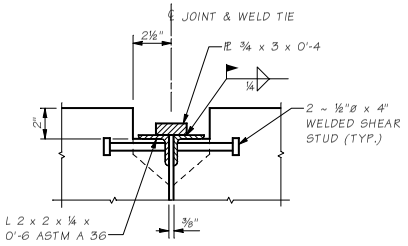


END VIEW EXTERIOR SLAB



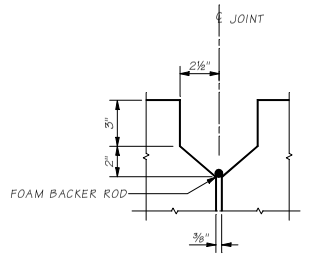
SECTION C 2

WELD TIE
ALTERNATE #1

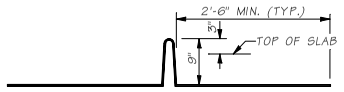


SECTION C 2

WELD TIE
ALTERNATE #2

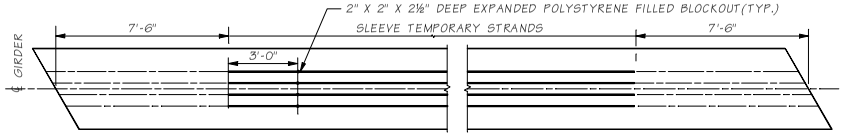


SECTION B 2



DEVELOPED ELEVATION LIFTING LOOP

MINIMUM OF 8 STRANDS PER SLAB.

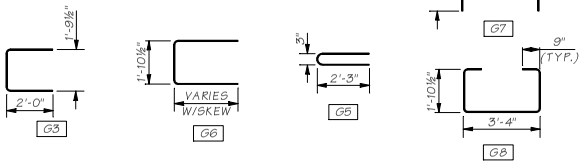


PLAN VIEW OF TEMPORARY STRANDS

BARLIST

ALL REINFORCING SHALL BE ASTM A 706

MARK	LOCATION	SIZE	NO. REQ'D	
G1	LONGIT. - TOP	4	4	STR.
G2	LONGIT. - BOT.	4	4	STR.
G3	END TIE	4	8	
G4	END TIE	4	4	
G5	END TIE	3	4	
G6	END TIE	5	AS REQ'D BY SKEW	
G7	TRANSV. - TIE	4	VARIES WITH SPAN	
G8	TRANSV. - STIRRUP	4	VARIES WITH SPAN	
G9	VERTICAL	4 ℄	VARIES WITH SPAN	



≠ VARIABLE LENGTH TO ANCHOR PROVIDED BY VOIDED SLAB MANUFACTURER (BASED ON ANCHOR PLACEMENT.

DESIGN TABLE

SPAN NUMBER	SPAN LENGTH ℄/℄ BRG. (FT.)	SLAB NUMBER	STRENGTH OF CONCRETE		BOTTOM STRANDS			TOP TEMPORARY STRANDS		LOCATION OF C.G. OF BOTTOM STRAND "E" (IN.)	CAMBER (IN.)		
			@ FINAL F'C (KSI)	@ RELEASE F'CI (KSI)	NO. OF DEBOND STRANDS	NO. OF BONDED STRANDS	JACKING FORCE (KIPS)	NO. OF STRANDS	JACKING FORCE (KIPS)		C	D 40	D 120

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCPS 26 VOIDED SLAB 2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

Thu Jan 11 11:51:47 2007

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

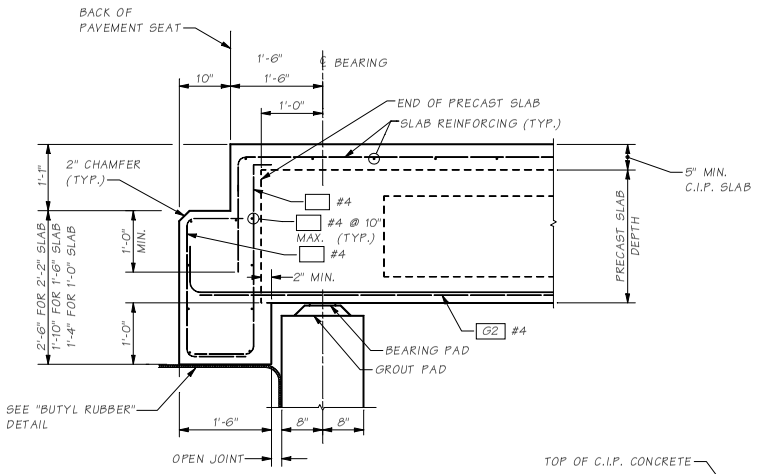
2'-2" VOIDED SLAB DETAILS 2 OF 2

BRIDGE SHEET NO.

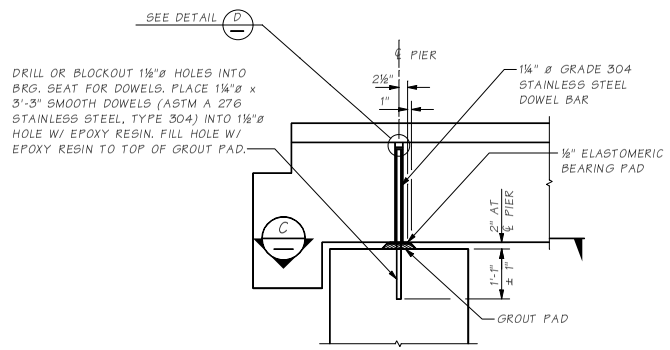
SHEET OF SHEETS

SR JOB NO. SHEET

5.6-A21-2

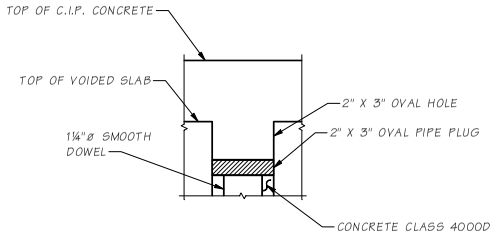


END PIER DETAIL

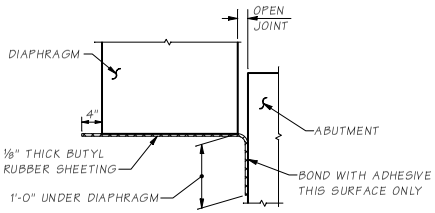


DOWEL BAR & BEARING DETAILS ##

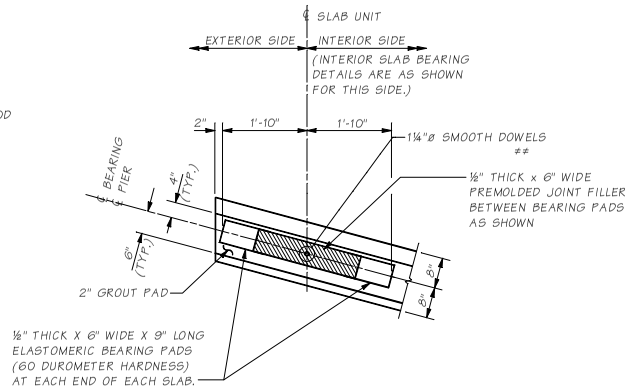
DOWEL BARS MAY BE DELETED IF TRANSVERSE STOPS AT END PIERS ARE PROVIDED



DETAIL D



ELEVATION
BUTYL RUBBER
AT DIAPHRAGM



SECTION C

NOTE:
FULL BEARING OF SLAB UNIT IS REQUIRED AT EACH ELASTOMERIC BEARING

Bridge Design Engr.	M:\STANDARDS\Girders\Flat Slab\PCPS END PIER DET.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APP'D					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD PRESTRESSED CONCRETE GIRDERS

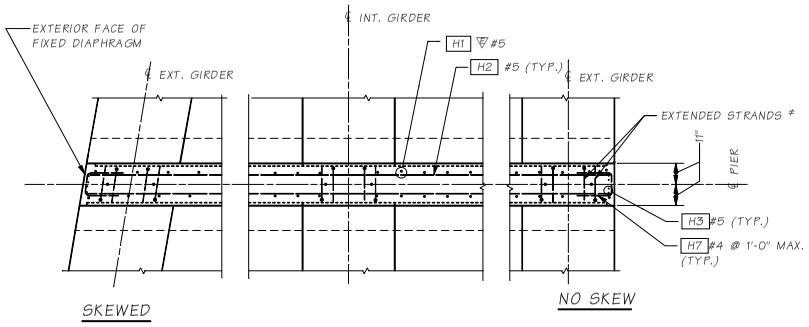
VOIDED SLAB END PIER

BRIDGE SHEET NO.

SHEET OF SHEETS

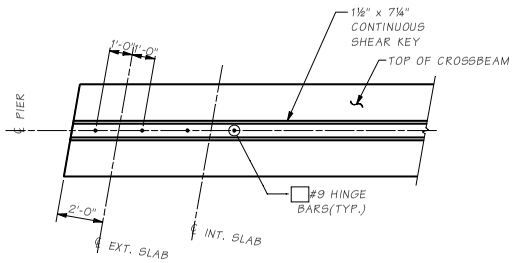
SR JOB NO. SHEET 5.6-A21-3

Thu Jan 11 11:51:42 2007

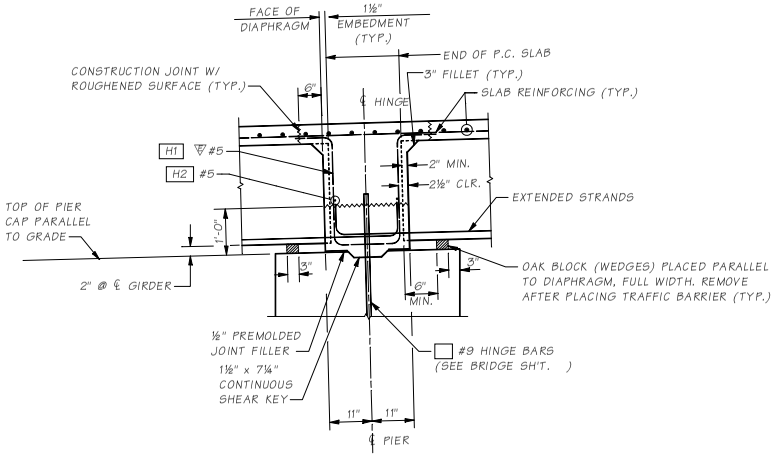


PLAN - HINGE DIAPHRAGM

10° MAX. SKEW FOR HINGE DIAPHRAGM.
FOR EXTENDED STRAND DETAIL SEE GIRDER SHEET

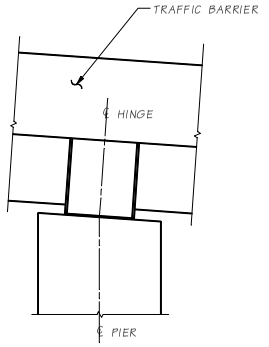


HINGE BAR PLAN



TYPICAL HINGE SECTION

** FOR SAWTOOTH SHEAR KEY DETAILS, SEE GIRDER SHEETS.



TYPICAL END VIEW HINGE DIAPHRAGM

Bridge Design Engr.	Jugesh Kapur	M:\STANDARDS\Girders\Flat Slab\PCPS INTERMEDIATE PIER.MAN				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Supervisor	Sup					10	WASH.				Washington State Department of Transportation
Designed By	Designer Date					JOB NUMBER					STANDARD PRESTRESSED CONCRETE GIRDER
Checked By	Checker Date										HINGE DIAPHRAGM AT INTERMEDIATE PIER DETAILS
Detailed By	Detailer Date										BRIDGE SHEET NO.
Bridge Projects Engr.											SHEET OF SHEETS
Prelim. Plan By											
Architect/Specialist		DATE	REVISION	BY	APP'D						

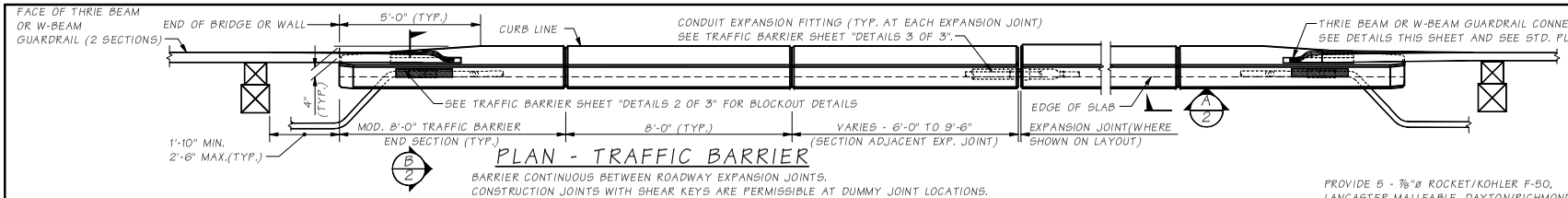
SR 5 FILE NO. 407 SHEET 1

5.6-A21-4

Thu Jan 11 13:22:23 2007

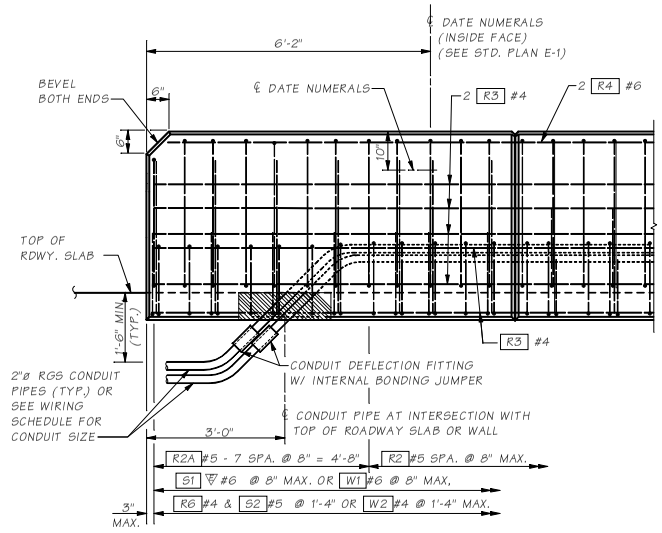
Chapter 10 Signs, Barriers, Approach Slabs & Utilities

Appendix 10.1-A1-1	Monotube Sign Structures Sign Bridge Layout	June 2006
Appendix 10.1-A1-2	Monotube Sign Structures Cantilever Layout	June 2006
Appendix 10.1-A2-1	Monotube Sign Structures Structural Details 1	June 2006
Appendix 10.1-A2-2	Monotube Sign Structures Structural Details 2	June 2006
Appendix 10.1-A3-1	Monotube Sign Structures foundation Type 1	June 2006
Appendix 10.1-A3-2	Monotube Sign Structures foundation Type 2 and 3	June 2006
Appendix 10.1-A4-1	Monotube Sign Structures Double Faced Barrier Foundation	June 2006
Appendix 10.1-A4-2	Single Slope Barrier Foundation	June 2006
Appendix 10.1-A5-1	Truss Sign Structures Double Faced Barrier Foundation	June 2006
Appendix 10.1-A5-2	Truss Sign Structures Single Slope Barrier Foundation	June 2006
Appendix 10.2-A1-1	Traffic Barrier – Shape F Detail 1 of 3	June 2006
Appendix 10.2-A1-2	Traffic Barrier – Shape F Detail 2 of 3	June 2006
Appendix 10.2-A1-3	Traffic Barrier – Shape F Detail 2 of 3	June 2006
Appendix 10.2-A2-1	Traffic Barrier – Shape F – Details 1 of 3	June 2006
Appendix 10.2-A2-2	Traffic Barrier – Shape F – Details 2 of 3	June 2006
Appendix 10.2-A2-3	Traffic Barrier – Shape F – Details 3 of 3	June 2006
Appendix 10.2-A3-1	Traffic Barrier – Single Slope Details 1 of 3	June 2006
Appendix 10.2-A3-2	Traffic Barrier – Single Slope Details 2 of 3	June 2006
Appendix 10.2-A3-3	Traffic Barrier – Single Slope Details 3 of 3	June 2006
Appendix 10.2-A4-1	Pedestrian Barrier Details 1 of 3	June 2006
Appendix 10.2-A4-2	Pedestrian Barrier Details 2 of 3	June 2006
Appendix 10.2-A4-3	Pedestrian Barrier Details 3 of 3	June 2006
Appendix 10.2-A5-1	Traffic Barrier – Shape E 42” Detail 1 of 3	June 2006
Appendix 10.2-A5-2	Traffic Barrier – Shape E 42” Detail 2 of 3	June 2006
Appendix 10.2-A5-3	Traffic Barrier – Shape E 42” Detail 3 of 3	June 2006
Appendix 10.2-A6-1	Traffic Barrier – Single Slope 42” Details 1 of 3	February 2007
Appendix 10.2-A6-2	Traffic Barrier – Single Slope 42” Details 2 of 3	February 2007
Appendix 10.2-A6-3	Traffic Barrier – Single Slope 42” Details 3 of 3	February 2007
Appendix 10.2-A7-1	Traffic Barrier – Shape F Luminarie Anchorage Details	June 2006
Appendix 10.2-A7-2	Traffic barrier – Single Slope Luminaire Anchorage Details	June 2006
Appendix 10.4-A1-1	Thrie Beam Retrofit Concrete Baluster	June 2006
Appendix 10.4-A1-2	Thrie Beam Retrofit Concrete Railbase	June 2006
Appendix 10.4-A1-3	Thrie Beam Retrofit Concrete Curb	June 2006
Appendix 10.4-A1-4	WP Thrie Beam Retrofit SL1 – Details 1 of 1	June 2006
Appendix 10.4-A1-5	WP Thrie Beam retrofit SL1 – Details 2 of 2	June 2006
Appendix 10.4-A2-1	Traffic Barrier – Shape F Rehabilitation – Details 1 of 3	June 2006
Appendix 10.4-A2-2	Traffic Barrier – Shape F Rehabilitation – Details 2 of 3	June 2006
Appendix 10.4-A2-3	Traffic Barrier – Shape F Rehabilitation – Details 3 of 3	June 2006
Appendix 10.4-A5-1	Collision Rail Connection	June 2006
Appendix 10.5-A1-1	Bridge Railing Type Pedestrian Details 1 of 2	June 2006
Appendix 10.5-A1-2	Bridge Railing Type Pedestrian Details 2 of 2	June 2006
Appendix 10.5-A2-1	Bridge Railing Type BP Details 1 of 2	June 2006
Appendix 10.5-A2-2	Bridge Railing Type BP Details 2 of 2	June 2006
Appendix 10.5-A3-1	Bridge Railing Type S-BP Details 1 of 2	June 2006
Appendix 10.5-A3-2	Bridge Railing Type S-BP Details 2 of 2	June 2006
Appendix 10.5-A4-1	Pedestrian Railing Details 1 of 2	June 2006
Appendix 10.5-A4-2	Pedestrian Railing Details 2 of 2	June 2006
Appendix 10.5-A5-1	Bridge Railing Type Chain Link Snow Fence	June 2006
Appendix 10.6-A1-1	Bridge Approach Slab Details 1 of 2	June 2006
Appendix 10.6-A1-2	Bridge Approach Slab Details 2 of 2	June 2006
Appendix 10.6-A2-1	Pavement Seat Repair Details	June 2006
Appendix 10.6-A2-2	Pavement Seat Repair Details	June 2006

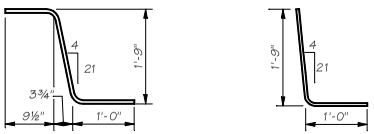


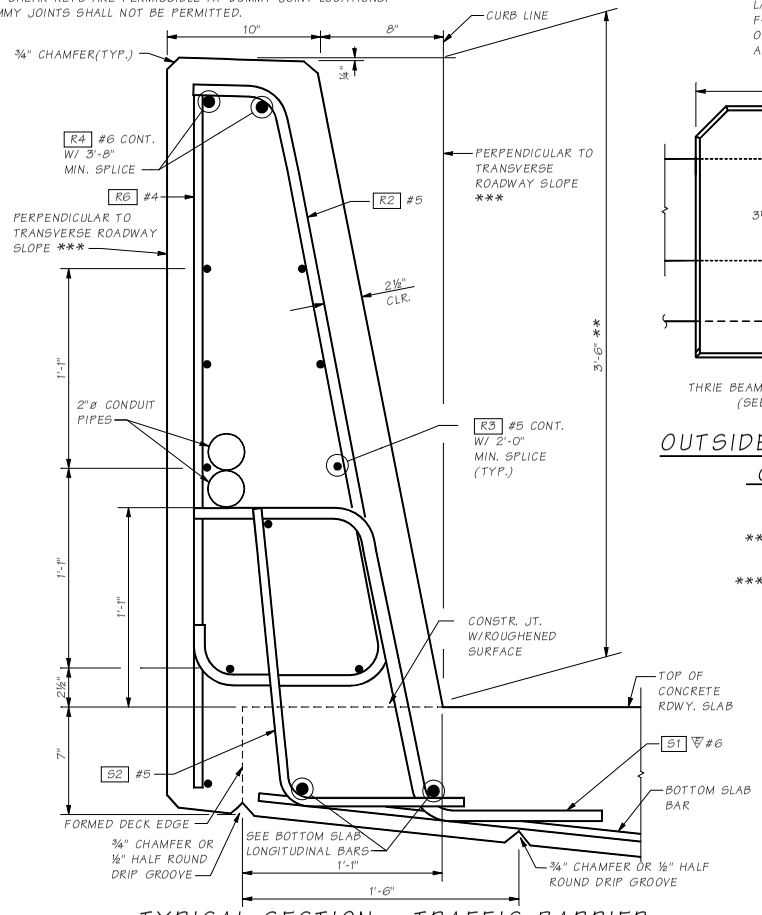
PLAN - TRAFFIC BARRIER

BARRIER CONTINUOUS BETWEEN ROADWAY EXPANSION JOINTS.
CONSTRUCTION JOINTS WITH SHEAR KEYS ARE PERMISSIBLE AT DUMMY JOINT LOCATIONS.
FORM JOINTS BETWEEN DUMMY JOINTS SHALL NOT BE PERMITTED.



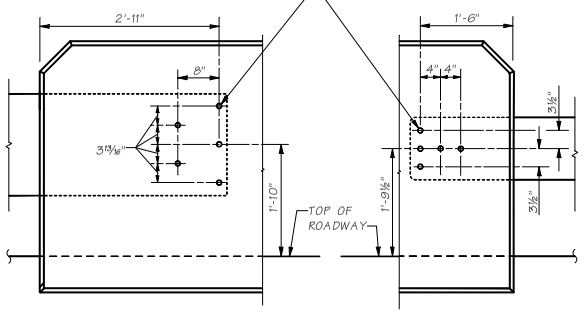
OUTSIDE ELEVATION END OF MODIFIED TRAFFIC BARRIER





TYPICAL SECTION - TRAFFIC BARRIER

PROVIDE 5 - ⅞"ø ROCKET/KOHLER F-50, LANCASTER MALLEABLE, DAYTON/RICHMOND F-62 FLARED THIN SLAB FERRULE INSERTS, OR APPROVED EQUAL. (RESIN-BONDED ANCHORS MAY BE SUBSTITUTED)



THRIE BEAM END SECTION DESIGN "F" (SEE STD. PLAN C-7a)

W-BEAM END SECTION DESIGN "F" (SEE STD. PLAN C-7)

OUTSIDE ELEVATION TRAFFIC BARRIER GUARDRAIL CONNECTION

(WHERE SHOWN ON LAYOUT)

** HEIGHT MAY VARY IF REQUIRED TO PROVIDE A PROFILE PLEASING TO THE EYE

*** FOR TRANSVERSE ROADWAY SLOPES GREATER THAN 8%, CHANGE THE NOTE TO THE FOLLOWING:
FOR THE LOW SIDE OF THE BRIDGE OR MEDIAN BARRIER - "PERPENDICULAR TO 8% TRANSVERSE ROADWAY SLOPE"
FOR THE HIGH SIDE OF THE BRIDGE BARRIER - "PERPENDICULAR TO TRANSVERSE ROADWAY SLOPE"

NOTE TO DESIGNERS

If transverse roadway slope is greater than 8%, S1 & S2 bar bends need to be modified to account for the difference between the actual slope & 8% on the low side only of the bridge or median barrier. The barrier geometry needs to be checked also.

NW REGION:
TERMINATE EACH CONDUIT PIPE AT SEPARATE TYPE 1 JUNCTION BOXES OFF END OF BRIDGE AS SHOWN ON LAYOUT.

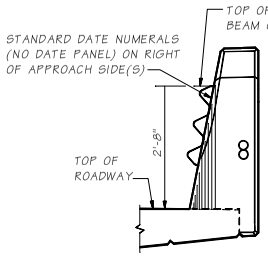
ALL OTHER REGIONS:
STUB OUT & CAP 3'- 4" FROM END OF BRIDGE BARRIER, EXCEPT TERMINATE IN JUNCTION BOX WHERE AND WHEN SHOWN ON LAYOUT.

Note to Designer: The non-applicable text should be removed from the actual bridge plans.

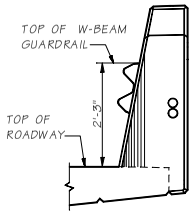
Bridge Design Engr.	M:\STANDARDS\Traffic Barriers\Single Slope\SS42TB1.man									
Supervisor					REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE AND STRUCTURES OFFICE
Designed By					10	WASH.				Washington State Department of Transportation
Checked By					JOB NUMBER					STANDARD TRAFFIC BARRIERS
Detailed By										TRAFFIC BARRIER - SINGLE SLOPE 42" DETAILS 1 OF 3
Bridge Projects Engr.										BRIDGE SHEET NO.
Prelim. Plan By										SHEET OF SHEETS
Architect/Specialist	DATE	REVISION	BY	APPD						

SR JOB NO. 10.2-AG-1 SHEET

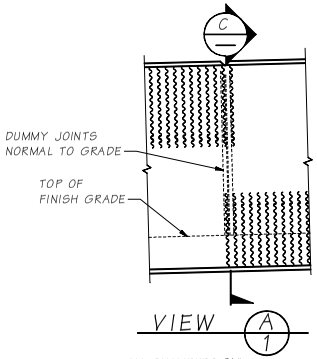
Thu Jan 11 11:52:34 2007



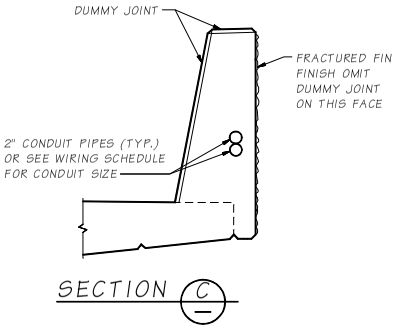
END VIEW
WITH "D" CONNECTION



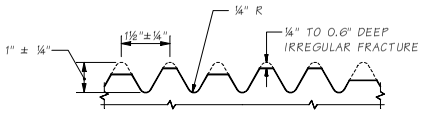
END VIEW
WITH "D" CONNECTION



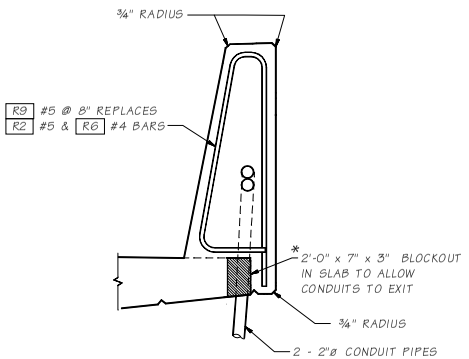
VIEW A/1
ALL CHAMFERS ¾"



SECTION C



FRACTURED FIN FINISH



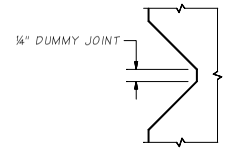
SLIPFORM ALTERNATE

SEE "TYPICAL SECTION - TRAFFIC BARRIER" FOR ADDITIONAL DETAILS.

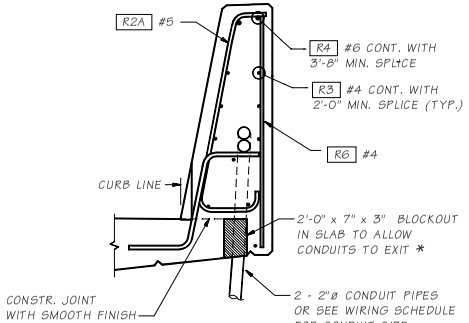
THE CONTRACTOR IS ADVISED THAT THE SLIPFORM CONSTRUCTION METHOD IS A PATENTED PROPRIETARY PROCESS FOR BARRIERS WITH A FRACTURED FIN FINISH.

JUNCTION BOX LOCATIONS

STATION	STATION



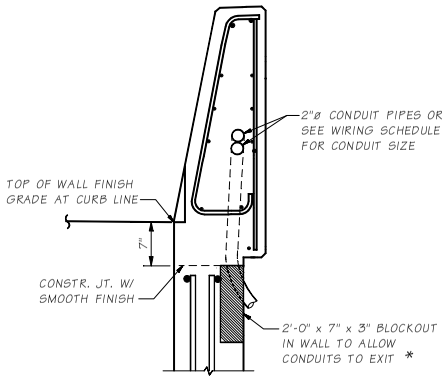
DUMMY JOINT DETAIL



SECTION B/1 BRIDGE

DETAIL FOR BRIDGE
FOR DETAILS NOT SHOWN SEE "OUTSIDE ELEVATION" AND "TYPICAL SECTION - TRAFFIC BARRIER"

* BLOCKOUT WIDTH MAY BE INCREASED TO 6" TO ALLOW CONDUITS OF A LARGER DIAMETER THAN 2" TO EXIT BARRIER OR WALL WITHOUT REBAR STEEL CONFLICT



SECTION B/1 WALL

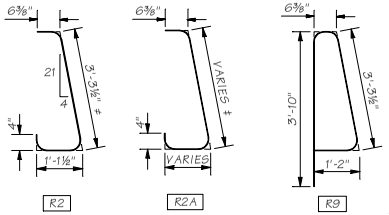
DETAIL FOR RETAINING WALL OR WINGWALL. FOR REINFORCING NOT SHOWN SEE STD. PLAN D-1a & D-1b OR WINGWALL PLAN. FOR DETAILS NOT SHOWN SEE SECTION B/1 BRIDGE

TRAFFIC BARRIER BAR LIST

MARK	SIZE	LENGTH	
R2	5	5'-1"	
R2a	5	(A)	
R3	4	(A)	STR.
R4	6	(A)	STR.
R6	4	3'-10"	STR.
R9	5	8'-11"	

(A) DETERMINE FROM PLANS

BENDING DIAGRAM (ALL DIMENSIONS ARE OUT TO OUT) ▽ DENOTES EPOXY COATED



FOR R9 & W2 BARS SEE WINGWALL OR RETAINING WALL PLANS. FOR S1 ▽ & S2 BARS SEE BARLIST.

± DIMENSIONS TO POINTS OF INTERSECTION.

Bridge Design Engr.	M:\STANDARDS\Traffic Barriers\Single Slope\SS42TB2.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS	BRIDGE SHEET NO.
Supervisor					10	WASH.				
Designed By					JOB NUMBER					SHEET
Checked By										
Detailed By										OF
3ridge Projects Engr.										
Prelim. Plan By										SHEETS
Architect/Specialist	DATE	REVISION	BY	APP'D						

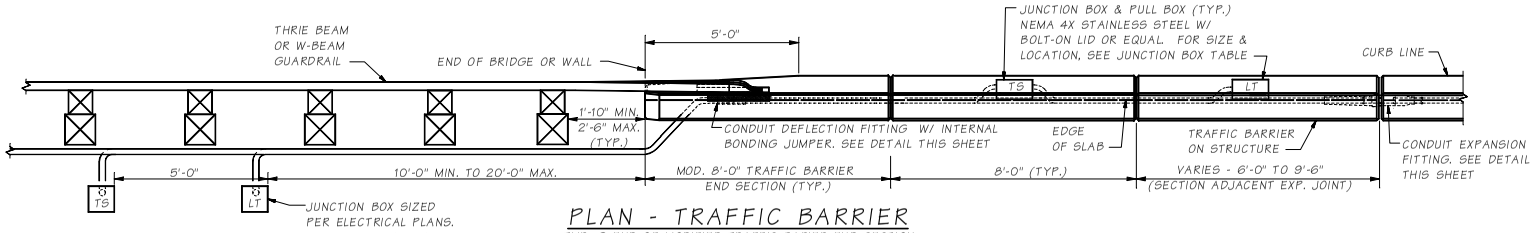
BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD TRAFFIC BARRIERS

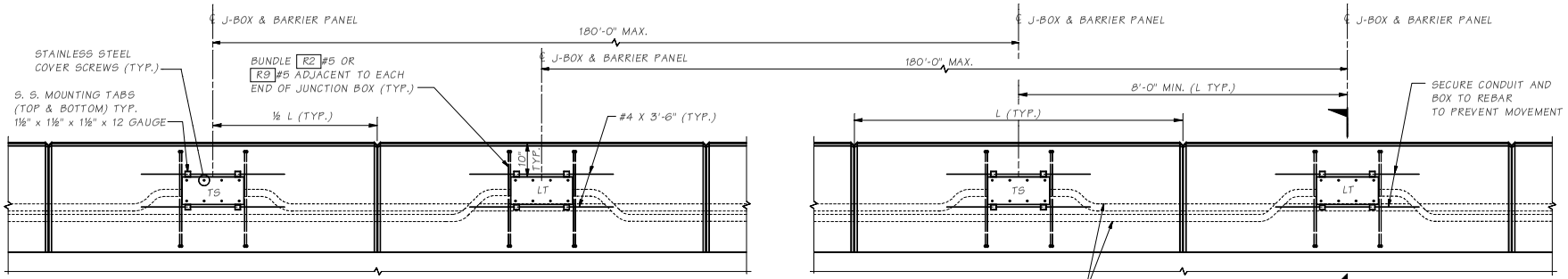
TRAFFIC BARRIER - SINGLE SLOPE 42'
DETAILS 2 OF 3

SHEET
ON JOB
SR
10.2-A6-2
Thu Jan 11 11:52:28 2007



PLAN - TRAFFIC BARRIER

TYP. @ END OF MODIFIED TRAFFIC BARIER END SECTION WHERE THRIE BEAM END SECTION "DESIGN F" STD. PLAN C-7a OR GUARDRAIL END SECTION "DESIGN D OR F" STD PLAN C-5 IS USED

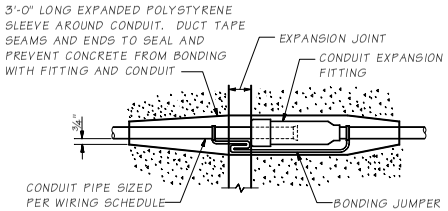


ELEVATION - CONDUITS & J-BOX IN TRAFFIC BARRIER

LABEL JUNCTION BOX COVER IN ACCORDANCE WITH STANDARD PLAN J-11a AND SPECIAL PROVISIONS. ADJACENT JUNCTION BOXES ARE SHOWN CENTERED BETWEEN ADJACENT DUMMY JOINTS. IF THE DISTANCE BETWEEN ADJACENT DUMMY JOINTS IS 16'-0" OR GREATER, PLACE ADJACENT JUNCTION BOXES SYMMETRICALLY ON EITHER SIDE OF THE CENTER OF ONE DUMMY PANEL WHILE MAINTAINING 8'-0" MINIMUM BETWEEN CENTER LINES OF THE JUNCTION BOXES.

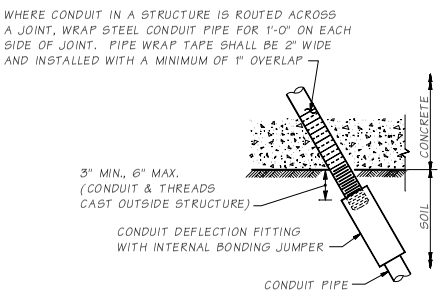
NOTE TO DESIGNERS

MODIFY THE FOLLOWING TO MATCH PROJECT REQUIREMENTS:
1. BARRIER END SECTION.
2. REMOVE GUARDRAIL IF NOT CONNECTED TO BRIDGE ITEM.
3. CONDUIT ALIGNMENT



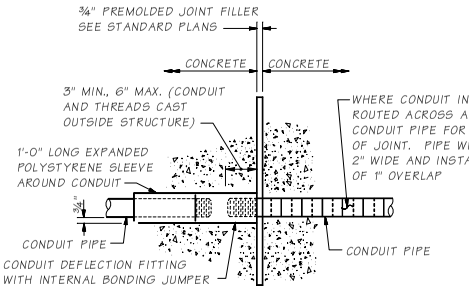
CONDUIT EXPANSION FITTING

CONDUIT FITTING - (TYPE AX FOR MOVEMENT OF ± 2") AT BRIDGE EXPANSION JOINTS



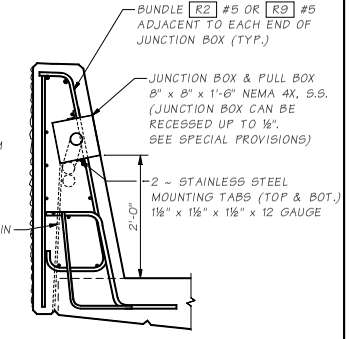
CONDUIT DEFLECTION FITTING A

CONDUIT FITTING - TYPE DX FOR DEFLECTION OF 30° AND ¾" MOVEMENT. PLACE AT CONDUIT PIPE EXIT FROM STRUCTURE



CONDUIT DEFLECTION FITTING B

CONDUIT FITTING - TYPE DX FOR DEFLECTION OF 30° AND ¾" MOVEMENT. CONDUIT PIPES PLACED THROUGH RETAIING WALL TRAFFIC BARRIER SHALL BE FITTED WITH DEFLECTION FITTINGS AT A MAXIMUM SPACING OF 120 FEET. THE DEFLECTION FITTINGS SHALL BE PLACED AT THE TRAFFIC BARRIER OPEN JOINT THAT COINCIDES WITH THE RETAINING WALL STEM EXPANSION JOINT NEAREST TO THE TRANSVERSE CONSTRUCTION JOINT IN THE WALL FOOTING.



SECTION A

Bridge Design Engr.	M:\STANDARDS\Traffic Barriers\Single Slope\SS42TB3.man				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor					10	WASH.			
Designed By					JOB NUMBER				
Checked By									
Detailed By									
Bridge Projects Engr.									
Prelim. Plan By									
Architect/Specialist	DATE	REVISION	BY	APPD					

BRIDGE AND STRUCTURES OFFICE

Washington State Department of Transportation

STANDARD TRAFFIC BARRIERS

TRAFFIC BARRIER - SINGLE SLOPE 42" DETAILS 3 OF 3

BRIDGE SHEET NO.

SHEET OF SHEETS

SR JOB NO. SHEET

10.2-A6-3

Thu Jan 11 11:52:40 2007

Contents

Chapter 13 Bridge Load Rating

13.1 General

Bridge Load Rating is a procedure to evaluate the adequacy of various structural components to carry predetermined live loads. The Bridge Load Rating Engineer in the WSDOT Bridge Preservation Office is responsible for the bridge inventory and load rating of existing and new bridges in accordance with the NBIS and the AASHTO Manual for Condition Evaluation of Bridges, latest edition. As presently required, only elements of the superstructure will be rated. Generally, the superstructure shall be defined as all structural elements above the column tops including drop crossbeams.

In order to provide a baseline rating for new bridges, load ratings are required for all new bridges, widened (one lane width or more throughout the length of the bridge), or rehabilitated bridges where the rehabilitation alters the load carrying capacity of the structure. The carrying capacity of a widened or rehabilitated structure shall equal or exceed the capacity of the existing structure.

The Bridge Design Section does not load rate new bridges during the design phase. However, copies of the computer models used in the design process shall be submitted to the Bridge Load Rating Engineer in the Bridge Preservation Section for the more complex structures where computer models were used in the design process.

The Bridge Preservation Office is responsible for maintaining an updated bridge load rating throughout the life of the bridge based on current bridge condition. Conditions of existing bridges change over time, resulting in the need for reevaluation of the load rating. Such changes may be caused by damage to structural elements, extensive maintenance or rehabilitative work, or any other deterioration identified by the Bridge Preservation Office through their regular inspection program.

This criteria applies only to concrete and steel bridges. For timber bridges, rating procedure shall be as per Chapters 6 and 7 of the 1994 AASHTO *Manual for Condition Evaluation of Bridges*.

Structural elements as defined above shall be evaluated for flexural, vertical shear, and torsional capacities based on Load Resistance Factor Design (LRFR) as outlined in the AASHTO 1989 *Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges* and Load Factor Design (LFD) as outlined in the latest AASHTO *Manual for Condition Evaluation of Bridges*. Consider all reinforcing, including temperature/distribution reinforcement, in the rating analysis.

By definition, the adequacy or inadequacy of a structural element to carry a specified truck load will be indicated by the value of its rating factor (RF); that is, whether it is greater or smaller than 1.0. For a specific loading, the lowest RF value of the structural elements will be the overall rating of the bridge.

13.1.1 WSDOT Rating (LRFR)

Ratings shall be performed per the 1989 AASHTO *Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges*. All bridges, except timber, shall be rated based on the Strength method.

A. Strength Method (LRFR)

The basic rating equations shall be:

$$RF = \frac{\Phi R_n - \gamma_{DL} D \pm S}{\gamma_L L(1 + I)}$$

When rating the full section of a bridge, like box girders, or crossbeams, which have two or more lanes, the following formulas apply for the overload trucks:

$$RF = \frac{\Phi R_n - \gamma_{DL} D \pm S - \gamma_L L_{Legal\ Load}(1 + I)}{\gamma_L L(1 + I)}$$

The formulas for the overloads assume that there is one overload truck in one lane, and legal trucks occupy the remaining lanes. Trucks shall be placed, in the lanes, in a manner that produces the maximum forces.

Where:

R.F.	=	Rating Factor (Ratio of Capacity to Demand)
R_n	=	Nominal Capacity of Section
D	=	Calculated Dead Load
S	=	Secondary Prestressing
L	=	Calculated Live Load
Φ	=	Resistance Factor (Capacity Reduction Factor)
γ_{DL}	=	Dead Load Factor.
γ_L	=	Live Load Factor
γ_P	=	Prestress Factor
I	=	Impact

*For continuous structures, a one-half support width moment increase is to be used.

B. Service Method (LRFR)

Prestressed and Post- tensioned Members

Prestressed and post-tensioned members in positive moment regions, and where post-tensioning is continuous over the supports, shall also be rated based on allowable stresses at service loads. The lowest rating factors between Service and Strength methods shall be the governing rating. The rating equations shall be:

Concrete Tension:

$$\text{R.F.} = \frac{F_A - (F_D + F_P + F_S)}{F_{L(1+I)}}$$

Concrete Compression:

$$\text{R.F.} = \frac{F_A - (F_D + F_P + F_S)}{F_{L(1+I)}}$$

$$\text{R.F.} = \frac{F_A - {}^1/_2 (F_D + F_P + F_S)}{F_{L(1+I)}}$$

Prestressing Steel:

$$\text{R.F.} = \frac{F_A - (F_D + F_P + F_S)}{F_{L(1+I)}}$$

R.F. = Rating Factor (Ratio of Capacity to Demand)

Allowable Concrete Tensile Stress:

F_A = $6\sqrt{f'_c}$

= $3\sqrt{f'_c}$ for severe corrosive exposure

= 0 for members without bonded reinforcement

Allowable Concrete compressive Stress:

F_A = $0.6\ f'_c$

= $0.4\ f'_c$ when checking live load plus one half of the dead and prestress compressive stresses.

Allowable Prestressing Tensile Stress

F_A = $0.80 f^*_y$ (Allowable Prestressing Tensile Stress) where f^*_y is the yield stress of the prestressing.

F_D = Dead Load Stress

F_p = Stress due to Prestress Force after all losses

F_S = Stress due to Secondary Prestress forces

$F_{L(1+I)}$ = Stress due to Live Load including Impact

For all loadings, prestress losses shall be per design or current Bridge Design Manual.

For the overload trucks, the allowable stresses shall be increased by 15 percent.

When the bending moment rating for the overload vehicles is less than 1.0 based on the Service Method, and greater than 1.0 based on the Strength Method, the moment rating shall be calculated by dividing the strength rating factor by 1.30, and the result cannot exceed 1.0.

Timber Members

$$R.F. = \frac{F_A - F_D}{F_L}$$

R.F. = Rating Factor (Ratio of Capacity to Demand)

F_A = Allowable bending stress

F_D = Dead Load Stress

F_L = Stress due to Live Load, does not include Impact

F_A is per AASHTO Standard Specs. with an increase of 33%.

C. Resistance Factors (LRFR)

The resistance factors shall be per Table 3b or Figure 4 of the 1989 AASHTO *Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges*. The resistance factors can be increased up to a maximum of 0.95, or decreased, depending on the condition, redundancy, type of inspection, and type of maintenance. For state owned bridges, assume careful inspection and vigorous maintenance and for local agency bridges, consult with the agency's Bridge Engineer.

Following are the NBI and BMS condition codes and their interpretation:

For NBI Codes > or = 6 (BMS States 1 and 2) — no deterioration
For NBI Codes = 5 (BMS State 3) — some deterioration
For NBI Codes < 5 (BMS State 4) — heavy deterioration

The BMS coding shall be used to identify the conditions of the elements being rated, and the appropriate resistance factors shall be applied.

When rating members that have section loss identified in the inspection report, the members should be modeled using the reduced section. Then, use the resistance factors for members in satisfactory condition.

D. Load Factors (LRFR)

Dead Load $\gamma D = 1.20$

Prestress Load $\gamma P = 1.00$

Live Load

1. Low volume roadways (ADTT less than 1,000), significant sources of over weight trucks without effective enforcement. $\gamma L = 1.65$
2. Heavy volume roadways (ADTT equal to or greater than 1,000), significant sources of over weight trucks without effective enforcement. $\gamma L = 1.80$
3. OL-1 and OL-2 (or other permit vehicles). $\gamma L = 1.30$

If ADTT is unavailable from traffic data, it may be estimated as 20 percent of ADT. The listed factors are essentially the same as Table 2 of AASHTO *Guide Specifications* except that Live Load Category 1 and 2 have been eliminated based on the assumption that Washington State does not have effective enforcement or control of overloads.

E. Impact (LRFR)

For new bridge designs, impact shall be 10 percent (0.1).

For existing bridges, the impact factor shall be determined by the approach roadway and the deck condition. For approach roadway condition codes 6 or greater, assume 10 percent impact; for codes less than 6, assume 20 percent impact. If the bridge deck condition is 6 or greater or has 0 to 4 percent scaling, assume 10 percent impact; if the deck condition is 5 or has between 5 and 15 percent scaling, assume 20 percent impact; if the deck condition is 4 or less and has greater than 15 percent scaling, assumes 30 percent impact.

F. Live Load Reduction Factors (LRFR)

Number of Loaded Lanes	Reduction Factor
One or two lanes	1.0
Three lanes	0.8
Four lanes or more	0.7

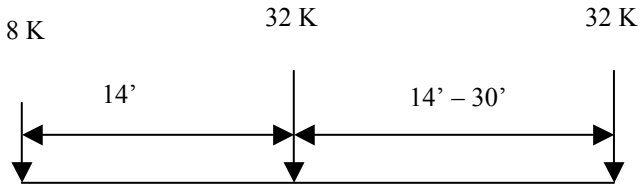
G. Live Loads (LRFR)

The moving loads for the rating shall be the HS-20 truck/lane loading (Figure 13.1-1), three legal trucks/ lane load (Figure 13.1-2), and two overload trucks. (Figure 13.1-3). The legal lane load shall be used to rate structures with spans over 200 feet. For the two overload trucks (OL-1 and OL-2), use only one overload truck occupying one lane in combination with one of the AASHTO legal trucks in each of the remaining lanes, when modeling the full section of the bridge or cross-beams. The number of lanes used shall be the actual striped lanes at the time of rating.

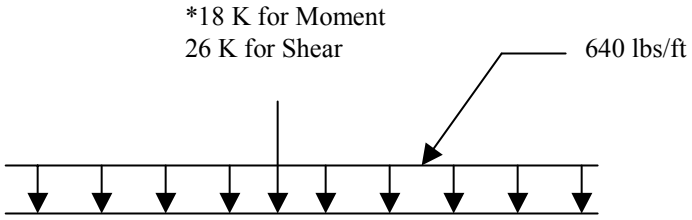
The three legal trucks and legal lane load, Type 3, Type 3S2, and Type 3–3, are to be used to determine posting limits. The two overload vehicles represent extremes in the limits of permitted vehicles in Washington State.

H. Rating Trucks

Design Trucks



HS-20 Truck

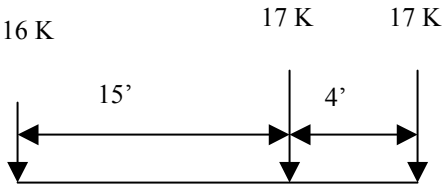


HS-20 Lane Load

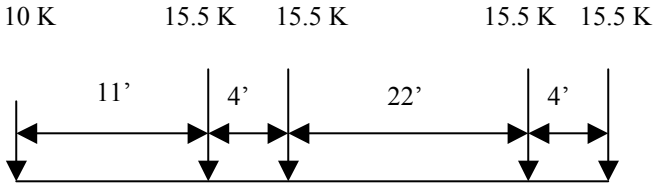
* In negative moment regions of continuous spans, place an equivalent load in the other span to produce the maximum effect.

Figure 13.1-1

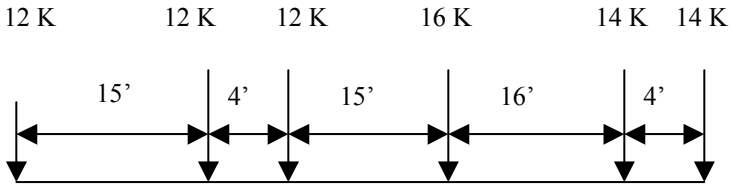
Legal Trucks



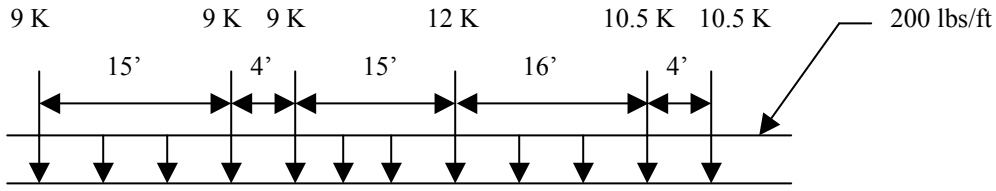
Type 3 Truck



Type 3S2 Truck



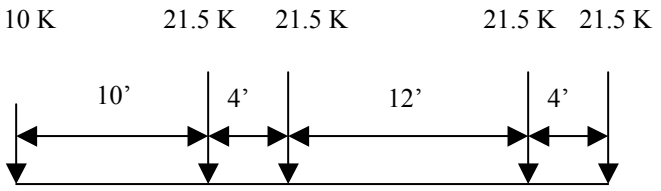
Type 3-3 Truck



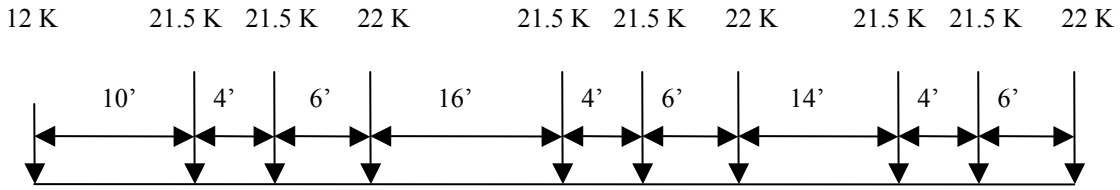
Legal Lane Load

Figure 13.1-2

Overload Trucks



Overload 1



Overload 2
Figure 13.1-3

13.1.2 NBI Rating (LFR)

Ratings shall be performed per the latest AASHTO *Manual for Condition Evaluation of Bridges*. All bridges, except timber, shall be rated based on the Load Factor method. The HS20 Truck/ Lane shall be used to calculate the Inventory and Operating Ratings.

A. Strength Method (LFR)

The basic equation shall be:

$$R.F. = \frac{\Phi R_n - \gamma_{DL} D \pm S}{\gamma_L L(1 + I)}$$

Where:

R.F. = Rating Factor (Ratio of Capacity to Demand)

R_n = Nominal Capacity of the Member

Φ = Resistance Factor (Per AASHTO Standard Specs.)

D = Unfactored Dead Load

L = Unfactored Live Load

S = Unfactored Prestress Secondary Moment or Shear

I = Impact Factor, Span dependant (Per AASHTO Standard Specs.)

γ_{DL} = 1.3 (Dead Load Factor)

γ_L = 2.17 for Inventory (Live Load Factor)

= 1.30 for Operating

Truck/Lane shall be used to calculate the Inventory and Operating Ratings.

B. Service Method (LFR)

1. Prestressed and Post-tensioned Members

Prestressed and post-tensioned members in positive moment regions, and where post-tensioning is continuous over the supports, shall also be rated based on allowable stresses at service loads. The lowest rating factor between Service and Load Factor methods shall be the governing Inventory rating. The Operating rating shall be based on the load factor method using a Live Load factor of 1.30. Service ratings for the HS20 shall be the same as stated in Section 13.1.1.B, except the impact factor shall be span dependant.

2. Timber Members

$$R.F. = \frac{F_A - F_D}{F_L}$$

R.F. = Rating Factor (Ratio of Capacity to Demand)

F_A = Allowable bending stress

F_D = Dead Load Stress

F_L = Stress due to Live Load, does not include Impact

* F_A, for Inventory rating, shall be per AASHTO Standard Specifications. For Operating Ratings, F_A shall be per AASHTO Standard Specifications with a 33% increase in the allowable stress.

C. Resistance Factors (LFR)

The resistance factors for NBI ratings shall be per the latest AASHTO Standard Specifications. Following are the NBI resistance factors:

Steel Members:	1.00 (Flexure) 1.00 (Shear)
Prestressed Concrete	1.00 (Flexure, Positive moment) 0.90 (Shear)
Post-tensioned, Cast in place:	0.95 (Flexure, Positive moment) 0.90 (Shear)
Reinforced Concrete:	0.90 (Flexure) 0.85 (Shear)

For prestressed and post-tensioned members, where reinforcing steel is used to resist negative moment, the resistance factors for reinforced concrete section shall be used in the ratings.

D. Live Loads

The HS-20 truck or lane shall be used to load rate bridge members. The number of lanes shall be per AASHTO Standard Specifications, Section 3.6. When multiple lanes are considered, apply the appropriate multilane reduction factor given in Section 13.1.2.F. Load distribution methods are discussed under specific bridge types. Do not consider sidewalk live loads in rating analysis.

E. Impact (LFR)

Impact is expressed as a fraction of the live load stress, and shall be determined by the following formula:

$$I = \frac{50}{125 + L}$$

I = Rating Factor (Ratio of Capacity to Demand)

L = Length in feet of the portion of the span that is loaded to produce the maximum stress in the member.

*AASHTO Standard Specifications for Highway Bridges 3.8.2.1.

F. Live Load Reduction Factors (LFR)

Number of Loaded Lanes	Reduction Factor
One or two lanes	1.0
Three lanes	0.9
Four lanes or more	0.75

13.2 Special Rating Criteria

13.2.1 Dead Loads

Dead Loads shall be as defined in the AASHTO *Standard Specifications for Highway Bridges*, except concrete weight shall be 155 pcf.

13.2.2 Live Load Distribution Factors

Live Load distribution factors shall be per Chapter 3 of the AASHTO *Standard Specifications for Highway Bridges.* Distribution factors are selected assuming one traffic lane where the roadway is less than 20 feet wide or two or more traffic lanes where the roadway is 20 feet or wider.

13.2.3 Reinforced Concrete Structures

For conventional reinforced concrete members of existing bridges, checking of serviceability shall not be part of the rating evaluation.

Rating for shear in the longitudinal direction shall begin at a distance $^{h}/2$ from the centerline of the bearing or face of integral cross beams (h= total depth).

13.2.4 Concrete Decks

For all concrete bridge decks, except flat slab bridges, that are designed per current AASHTO criteria for HS-20 loading or heavier, loading will be considered structurally sufficient and need not be rated. However, for existing bridge decks having any of the following conditions, rating of the deck is required:

1. Deck was designed for live loads lighter than HS-20.
2. Deck overhang is more than half the girder spacing.
3. Bridge Inspection Report Code is 4 or below.
4. When the original traffic barrier(s) or rail have been replaced by heavier barrier.

When rating of the deck is required, live load shall include all vehicular loads as specified in Section 13.1.1.H. Live load moments for the HS20 truck shall be per Section 3.24.3.1 of the AASHTO *Standard Specifications*. Live load moments for the legal and overload trucks shall be per the AASHTO *Manual for Maintenance Inspection of Bridges*.

13.2.5 Concrete Crossbeams

Live loads can be applied to the crossbeam as moving point loads at any location between curbs that produce the maximum effect.

When rating for shear in crossbeams, current AASHTO *Design Specifications* requires shear design to be at the face of support if there is a concentrated load within a distance “d” from the face of support. This requirement is new relative to earlier editions of AASHTO *Design Specifications* that allowed shear reinforcement design to be at a distance “d” from the face of support. When rating existing crossbeams that show no indication of distress on the latest inspection report, but have a rating factor of less than one (1.0), a more detailed/accurate shear analysis should be performed. One acceptable method is the “Strut and Tie” model analysis. For existing box girders and T-beams integral with the crossbeams, in lieu of this detailed analysis, dead and live loads can be assumed as uniformly distributed and the shear rating performed at a distance “d” from the face of support.

13.2.6 In-Span Hinges

For in-span hinges, rating for shear and bending moment should be performed based on the reduced cross-sections at the hinge seat. Diagonal hairpin bars are part of this rating as they provide primary reinforcement through the shear plane.

13.2.7 Concrete Box Girder Structures

Bridges with spread box girders shall be rated on a per box basis. Otherwise, the rating shall be on the per bridge basis for all applied loads.

13.2.8 Prestressed Concrete Girder Structures

Rate on a per member basis.

13.2.9 Concrete Slab Structures

Rate cast-in-place solid slabs on a per foot of width basis. Rate precast panels on a per panel basis. Rate cast-in-place voided slabs based on a width of slab equal to the predominant center-to-center spacing of voids.

When rating flat slabs on concrete piling, assume pin-supports at the slab/pile interface of interior piers and the slab continuous over the supports. If ratings using this assumption are less than 1.0, the piles should be modeled as columns with fixity assumed at 10 feet below the ground surface.

Pile caps are to be rated if deemed critical by the engineer.

13.2.10 Steel Structures

On existing bridges, checking of fatigue and serviceability shall not be part of the rating evaluation.

13.2.11 Steel Floor Systems

Floorbeams and stringers shall be rated as if they are simply supported. Assume the distance from outside face to outside face of end connections as the lengths for the analysis. Live loads can be applied to the floorbeam as moving point loads at any location between curbs, which produce the maximum effect.

Rating of connections is not required unless there is evidence of deterioration.

13.2.12 Steel Truss Structures

Rate on a per truss basis or perform a 3-D analysis or simplified distribution methods. Assume nonredundancy of truss members and pinned connections.

In general, rate chords, diagonals, verticals, end posts, stringers, and floorbeams. Do not rate connections unless there is evidence of deterioration, except connections with structural pins. For pin-connected trusses, analyze pins for shear, and the side plates for bearing capacity.

For truss members that have been heat-straightened three or more times, deduct 0.1 from ϕ(Phi).

13.2.13 Timber Structures

Unless the species and grade is known, assume Douglas fir, select structural for members installed prior to 1955 and Douglas fir, No. 1 after 1955. The allowable stresses for beams and stringers shall be as listed in the AASHTO *Standard Specifications*.

The nominal dimensions should be used to calculate dead load, and the net dimensions to calculate section modulus. If the member is charred, it may be assumed that ¼-inch of material is lost on all surfaces. Unless the member is notched or otherwise suspect, shear need not be calculated.

When calculating loads, no impact is assumed.

13.2.14 Widened or Rehabilitated Structures

For widened bridges, rate crossbeams in all cases.

For existing bridges, a load rating shall be performed if the load carrying capacity of the longitudinal members is altered, or the dead and live loads have increased due to the widening.

Longitudinal rating for the widened portion will be required only when the width of the widened portion on one side of the structure is greater than or equal to 10′-0” or more throughout the length of the structure.

For rehabilitated bridges, a load rating will be required if the load carrying capacity of the structure is altered by the rehabilitation.

13.3 Load Rating Software

Rating of State bridges shall be performed using the BRIDG for Windows software, latest version.

For more complex structures such as Steel Curved girders and Arches, different software may be used to analyze the loads after obtaining approval from the Load Rating Engineer.