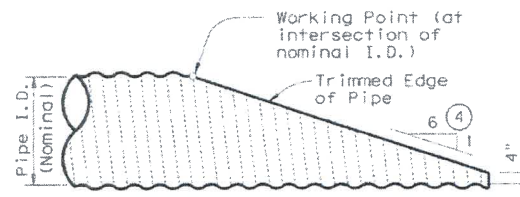


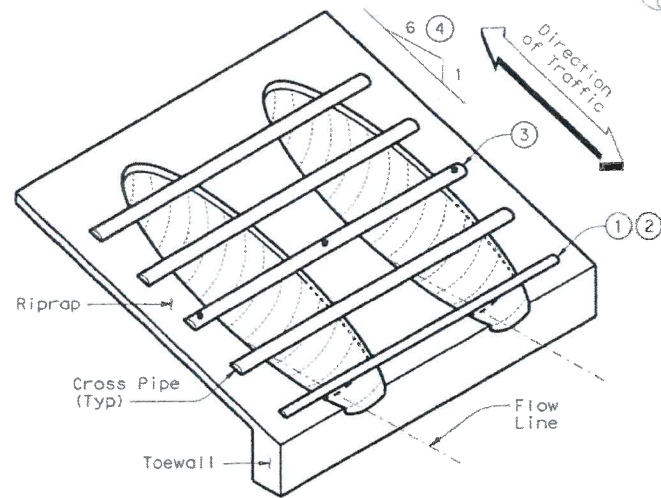
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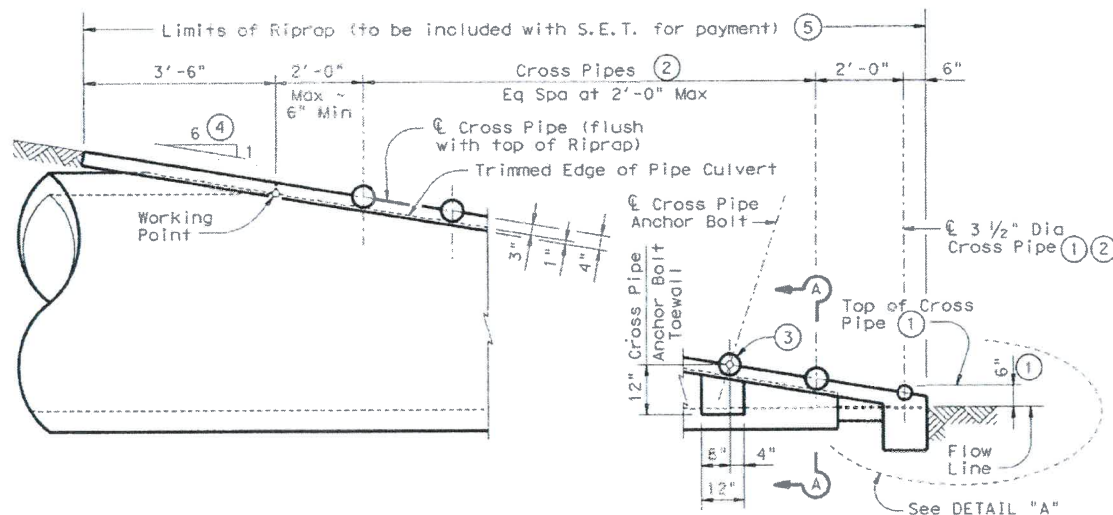
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.)
(Details of Concrete Pipe Culvert are similar.)

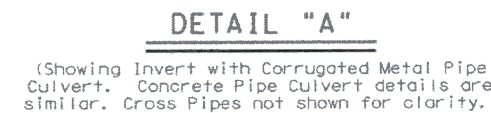
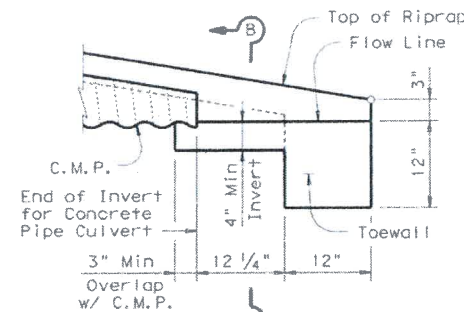
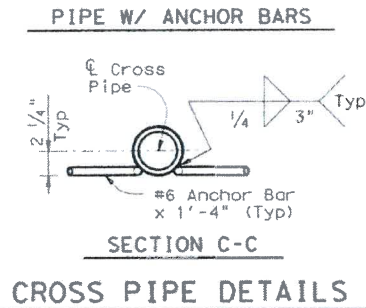
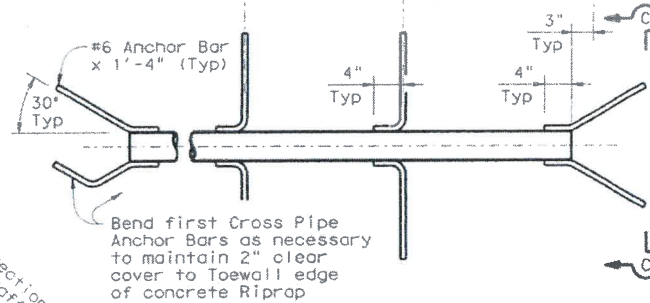
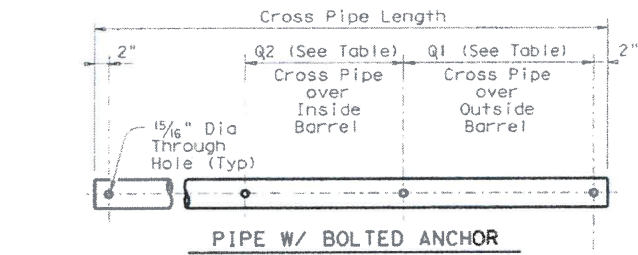


ISOMETRIC VIEW OF TYPICAL INSTALLATION

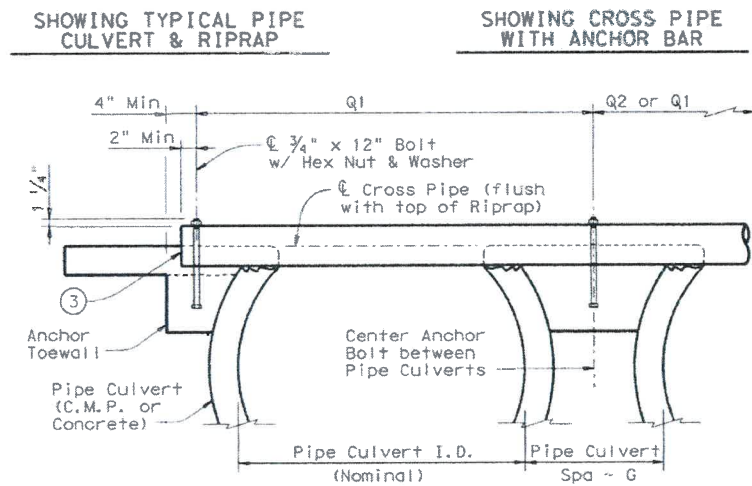
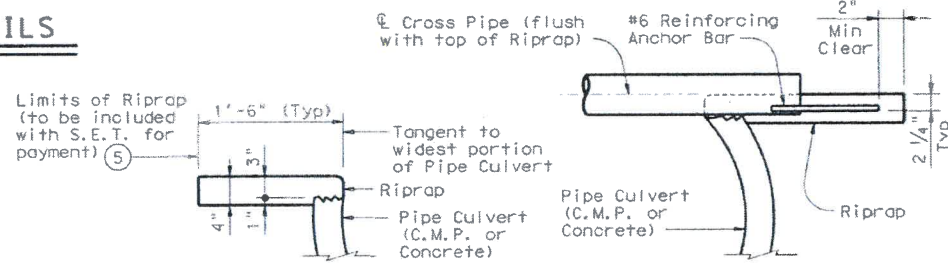


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



(Cross Pipes not shown for clarity.)



SECTION A-A

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'-1"	1'-9"	3 or more Pipe Culverts	3" Std (3,500" O.D.)
15"	0.7	11"	N/A	2'-5"	2'-2"		
18"	0.8	1'-2"	N/A	2'-10"	2'-8"		
21"	0.9	1'-4"	N/A	3'-2"	3'-1"		
24"	0.9	1'-7"	N/A	3'-6"	3'-7"	3 or more Pipe Culverts	3 1/2" Std (4,000" O.D.)
27"	1.0	1'-8"	N/A	3'-10"	3'-11"		
30"	1.1	1'-10"	N/A	4'-2"	4'-4"	2 or more Pipe Culverts	3 1/2" Std (4,000" O.D.)
33"	1.2	1'-11"	4'-2"	4'-5"	4'-8"	All Pipe Culverts	
36"	1.3	2'-1"	4'-5"	4'-9"	5'-1"	All Pipe Culverts	4" Std (4,500" O.D.)
42"	1.5	2'-4"	4'-11"	5'-5"	5'-10"		
48"	1.7	2'-7"	5'-5"	6'-0"	6'-7"	All Pipe Culverts	5" Std (5,563" O.D.)
54"	2.0	3'-0"	5'-11"	6'-9"	7'-6"		
60"	2.2	3'-3"	6'-5"	7'-4"	8'-3"	All Pipe Culverts	5" Std (5,563" O.D.)
66"	2.4	3'-3"	6'-11"	7'-10"	8'-9"		
72"	2.7	3'-4"	7'-5"	8'-5"	9'-4"		

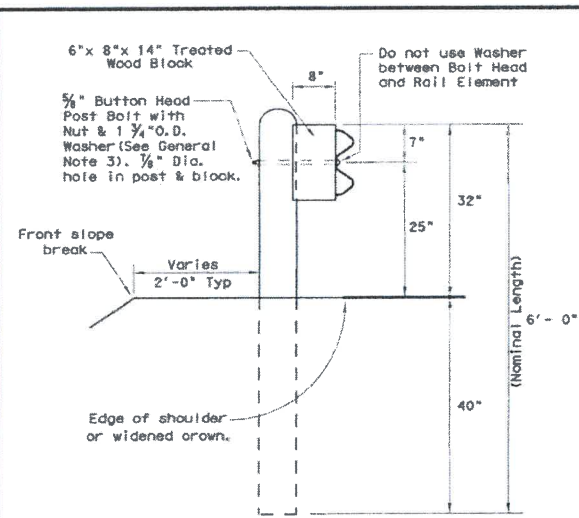
- The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
- Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
- The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
- Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:
Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.
Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap". Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.
Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52. Bolts and nuts shall conform to ASTM A307.
All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

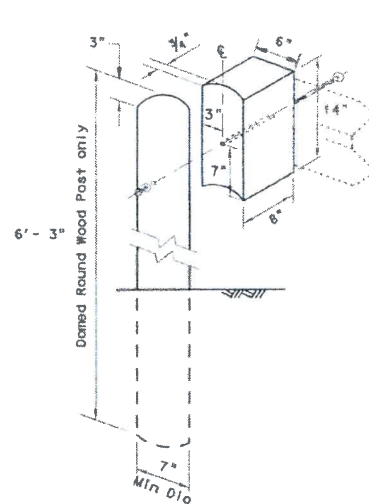
Texas Department of Transportation		Bridge Division Standard	
SAFETY END TREATMENT			
FOR 12" DIA TO 72" DIA			
PIPE CULVERTS			
TYPE II ~ PARALLEL DRAINAGE			
SETP-PD			
FILE: setpdse.dgn	DR: GAF	CK: CAT	DW: JRP
©TxDOT February 2010	CONT: SPC1	JOB:	HIGHWAY:
REVISIONS			
11-10: Add note for synthetic fibers.	DIST:	COUNTY:	SHEET NO:

DATE: FILE:

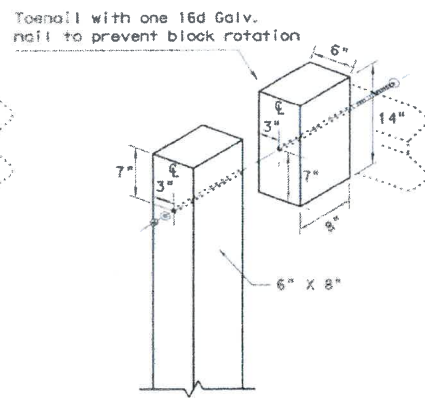
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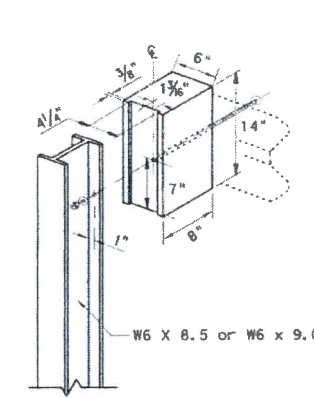
TYPICAL POST



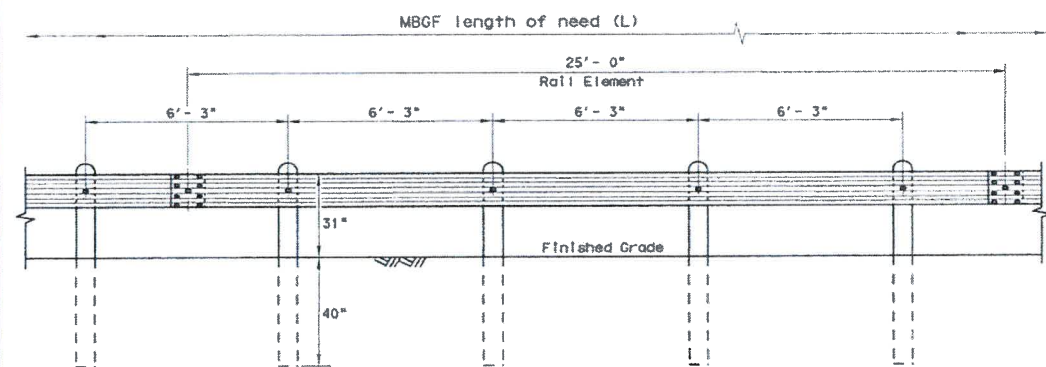
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST



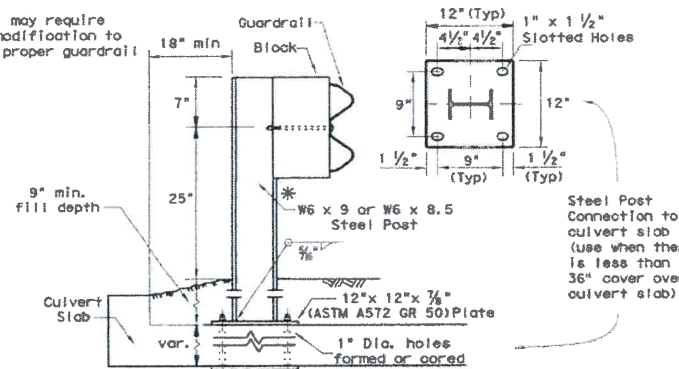
WOOD BLOCK TO STEEL POST



ELEVATION MID-SPAN RAIL SPLICE

Showing a 25'-0" section of W-Beam rail, 12'-6" rail sections may also be supplied (See General Note 2)

* Post(s) may require field modification to ensure proper guardrail height.

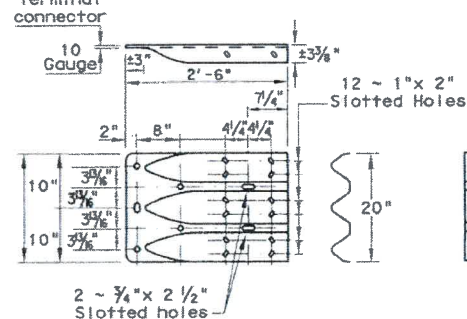


12" x 12" x 3/8" (ASTM A36) Steel bottom plate with 1" Dia. holes required with Bolt-Through Installation
 Bolt-Through Options: Requires a 6" min. slab thickness, 3/8" Dia (ASTM A449) heavy hex bolts with two hardened washer each and heavy hex nuts. Bolt length = Slab plus 2 1/4" min.

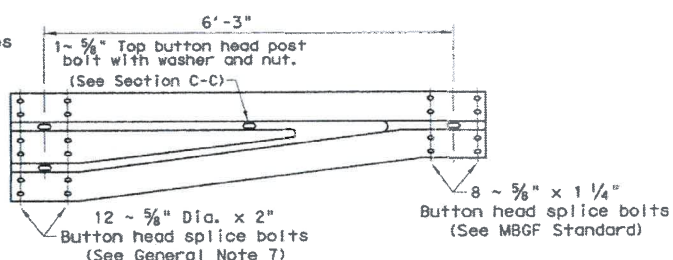
LOW FILL CULVERT POST

Culverts of 25 ft. or less, see GF(31)LS standard for "Long Span" option.

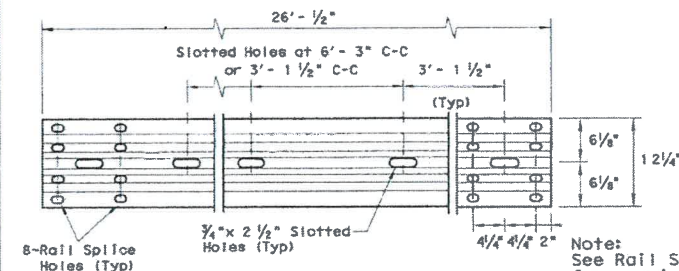
Epoxy Note:
 Epoxy Anchor Option: This option may only be used if the culvert slab is 8" min. thick. Threaded anchor rods must be 1/2" Dia. ASTM A449 or A193 Grade B7 with heavy hex nut, and one hardened washer each. Embed anchor rods 6" with Hilti HIT RE 500 epoxy adhesive. Other Type III Class C epoxy adhesives meeting the requirements of DMS-6100, "Epoxyes and Adhesives", may be used if it can be demonstrated that they meet or exceed the strength of Hilti HIT RE 500 with the same embedment depth and threaded rod dia. Follow the manufacturer's requirements for installing epoxied threaded rods. Extend rods 1/4" min. beyond nut.



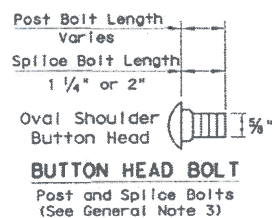
THRIE-BEAM TERMINAL CONNECTION
 (SEE GENERAL NOTES 6 & 7 FOR REQUIRED HARDWARE)



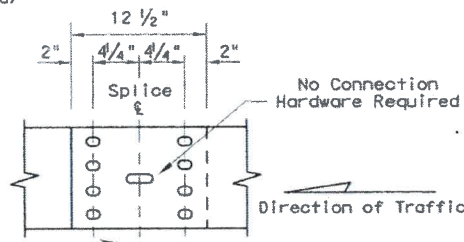
NON-SYMMETRICAL TRANSITION TO W-BEAM (10 GAUGE)



ELEVATION 25'-0" (NOM.) W-BEAM SECTION
 12'-6" RAIL SECTIONS MAY ALSO BE SUPPLIED (SEE GENERAL NOTE 2)

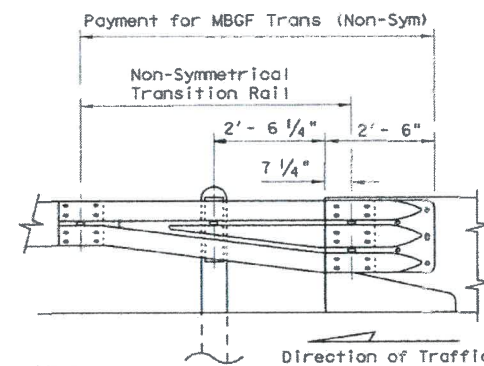


BUTTON HEAD BOLT
 Post and Splice Bolts (See General Note 3)



Note: GF(31), Mid-Span rail splices are required with 6'-3" post spacings.

MID-SPAN RAIL SPLICE DETAIL



Note: All rail elements shall be lapped in the direction of adjacent traffic.

DOWNSTREAM RAIL ATTACHMENT

GENERAL NOTES

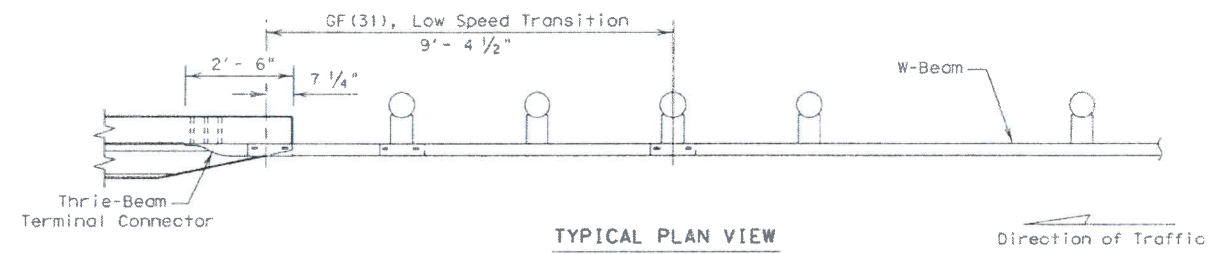
- The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of MBGF shall be shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
- Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans. The Contractor may furnish rail elements of 25'-0", or 12'-6" (nom.) lengths. Rail elements may have slotted holes at 3'-1 1/2" C-C or 6'-3" C-C. A special length of rail may be manufactured to accommodate the downstream anchor terminal (DAT) and the transition sections of guardrail.
- Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 3/4" O.D.) washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" (or 2" long at triple rail splices) with a 3/8" double recessed nut (ASTM A563). Thrie beam "connection" 3/8" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
- Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
- Crown shall be widened to accommodate the Metal Beam Guard Fence.
- The lateral approach to the guard fence, shall have a maximum slope of 1V:10H.
- If shown elsewhere in the plans or as directed by the Engineer, the guard fence may be flared at a rate of 25:1 or flatter.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 25 inches above the gutter pan or edge of shoulder.
- If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18", drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever maybe less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
- Posts shall not be set in concrete, of any depth.
- Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
- Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL may furnish composite material posts and/or blocks.
- For posts located partially or wholly between precast box culvert units, the use of a cast-in-place concrete closure between boxes is required. See Detail "A" on Bridge Standard SCP-MD.

		Design Division Standard	
<h1>METAL BEAM GUARD FENCE</h1> <h2>GF(31)-14</h2>			
FILE: gf3114.dgn	Rev: TxDOT	CR: AM	DR: VP
© TxDOT: December 2011	CONT: SECT	JOB:	HIGHWAY:
REVISIONS:	DIST:	COUNTY:	SHEET NO.:

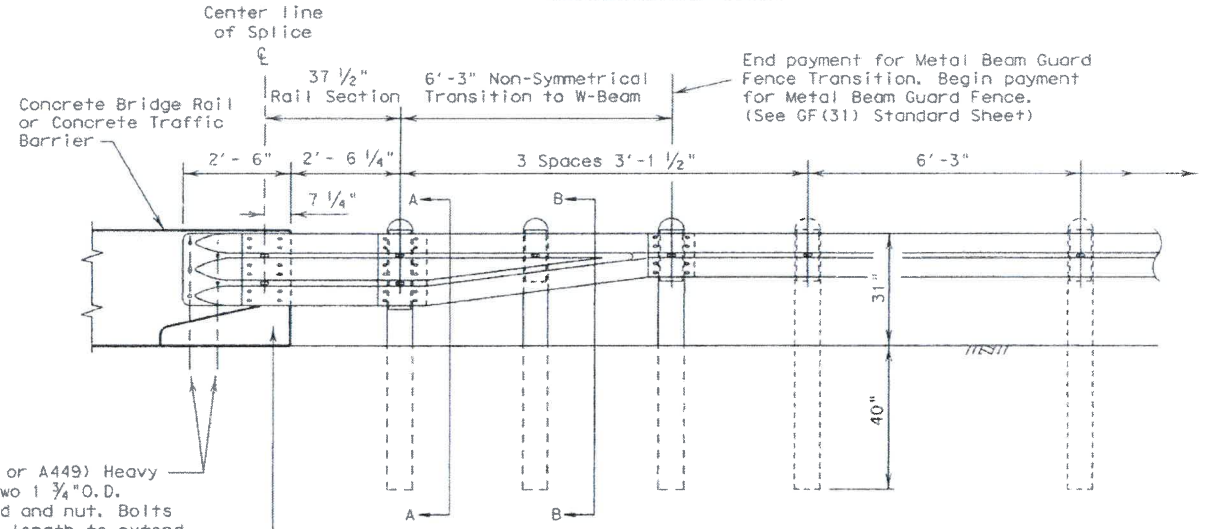
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TYPICAL PLAN VIEW



TYPICAL ELEVATION VIEW

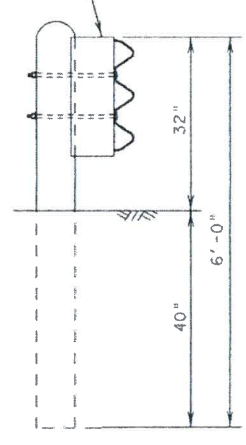
5 - 5/8" Dia. (ASTM A325 or A449) Heavy Hex Head Bolts, with two 1 1/4" O.D. washers under each head and nut. Bolts shall be of sufficient length to extend through the full thickness of the rail, washer, and nut. Install with bolt heads on traffic face.

Chamfer required on concrete rails that extend beyond the face of the guardrail transition.

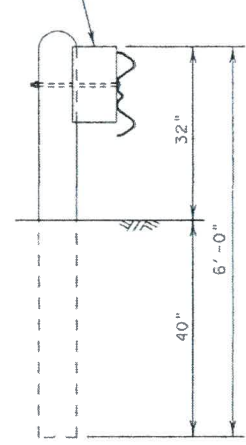
TERMINAL CONNECTION NOTE
To ensure a stable connection, (12) Rectangular Washers (FWR03) are required under the recessed nuts at the Terminal Connection splice.

This post location requires a Thrie-Beam Block (6"x 8"x 22" Nom).

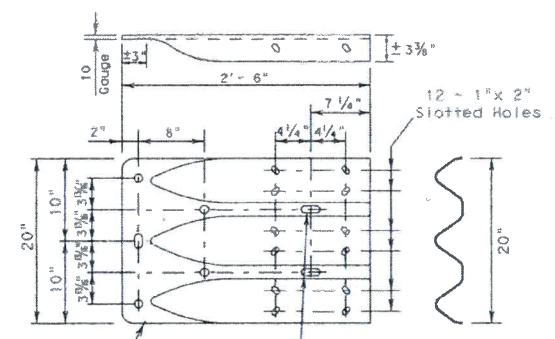
Standard Block (6"x 8"x 14" Nom)



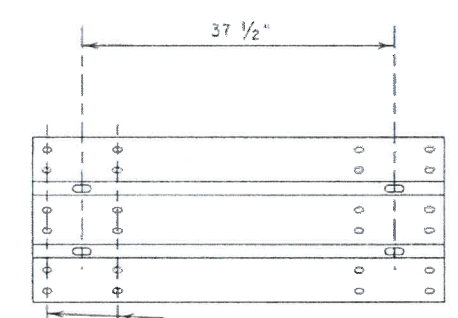
SECTION A-A



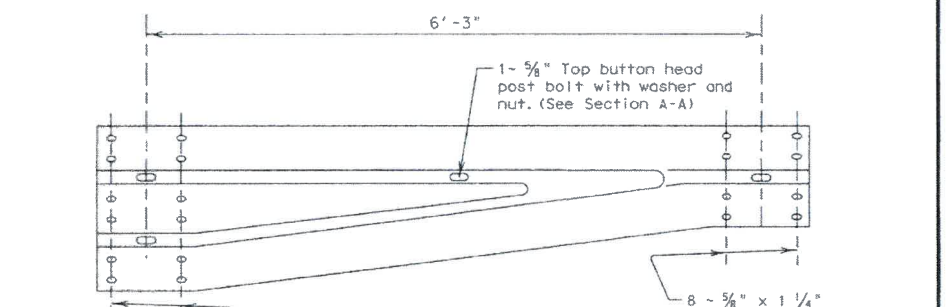
SECTION B-B



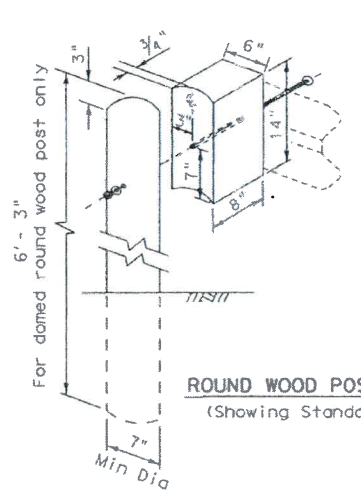
THRIE-BEAM TERMINAL CONNECTION (See Terminal Connection Note)



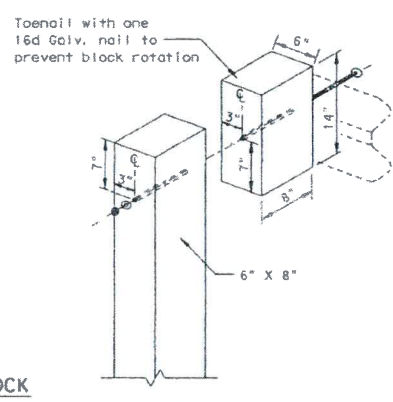
THRIE-BEAM (3'-1 1/2") (10 GA.) ELEMENT SECTION



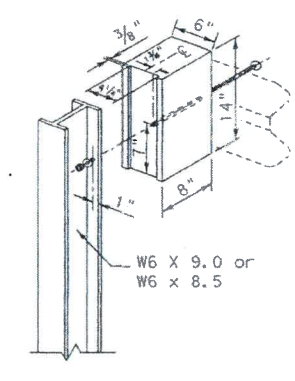
NON-SYMMETRICAL (10 GA.) TRANSITION SECTION



ROUND WOOD POST & BLOCK (Showing Standard Block)



WOOD BLOCK TO RECTANGULAR WOOD POST



STEEL POST & BLOCK (Showing Standard Block)

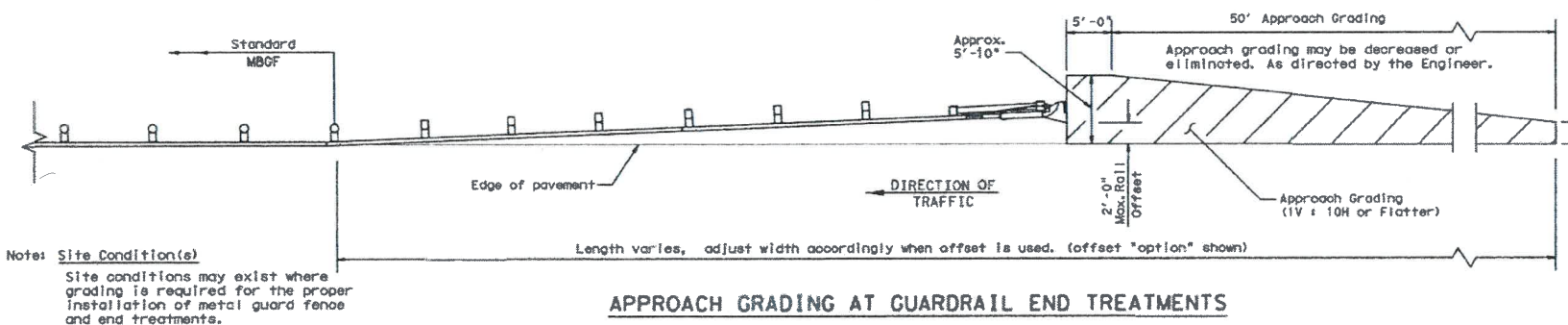
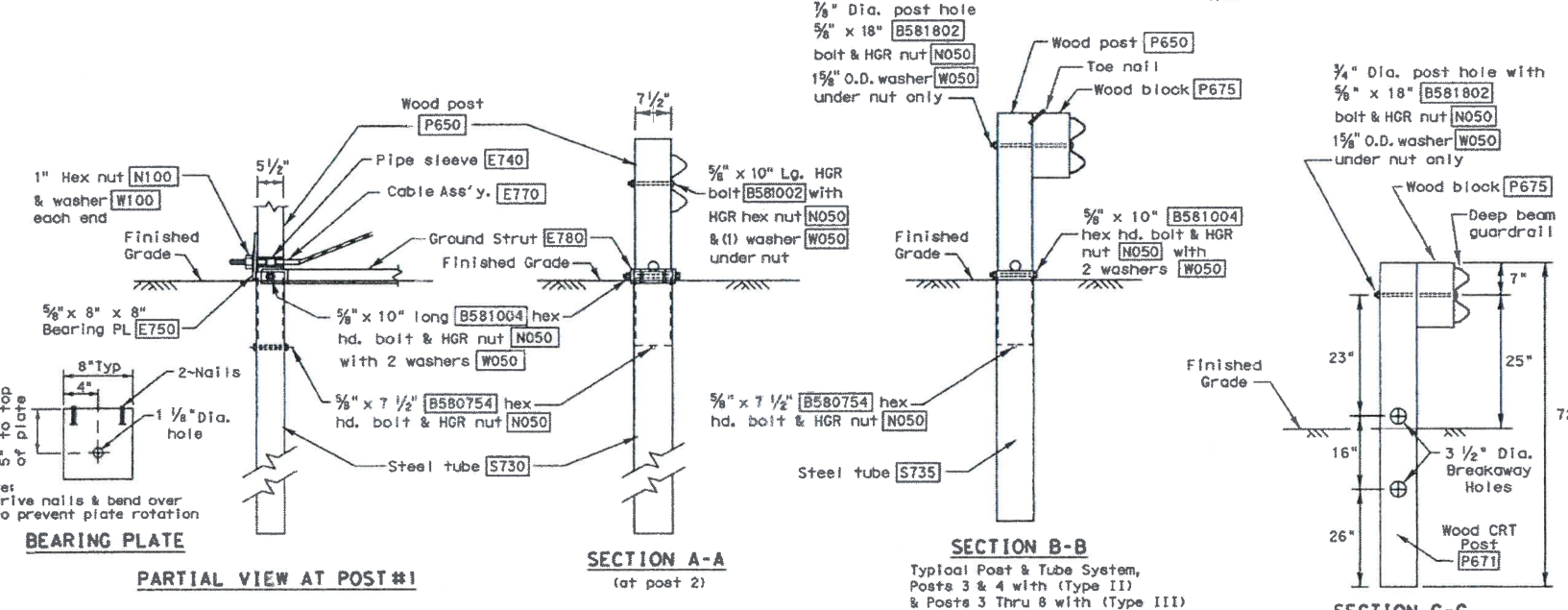
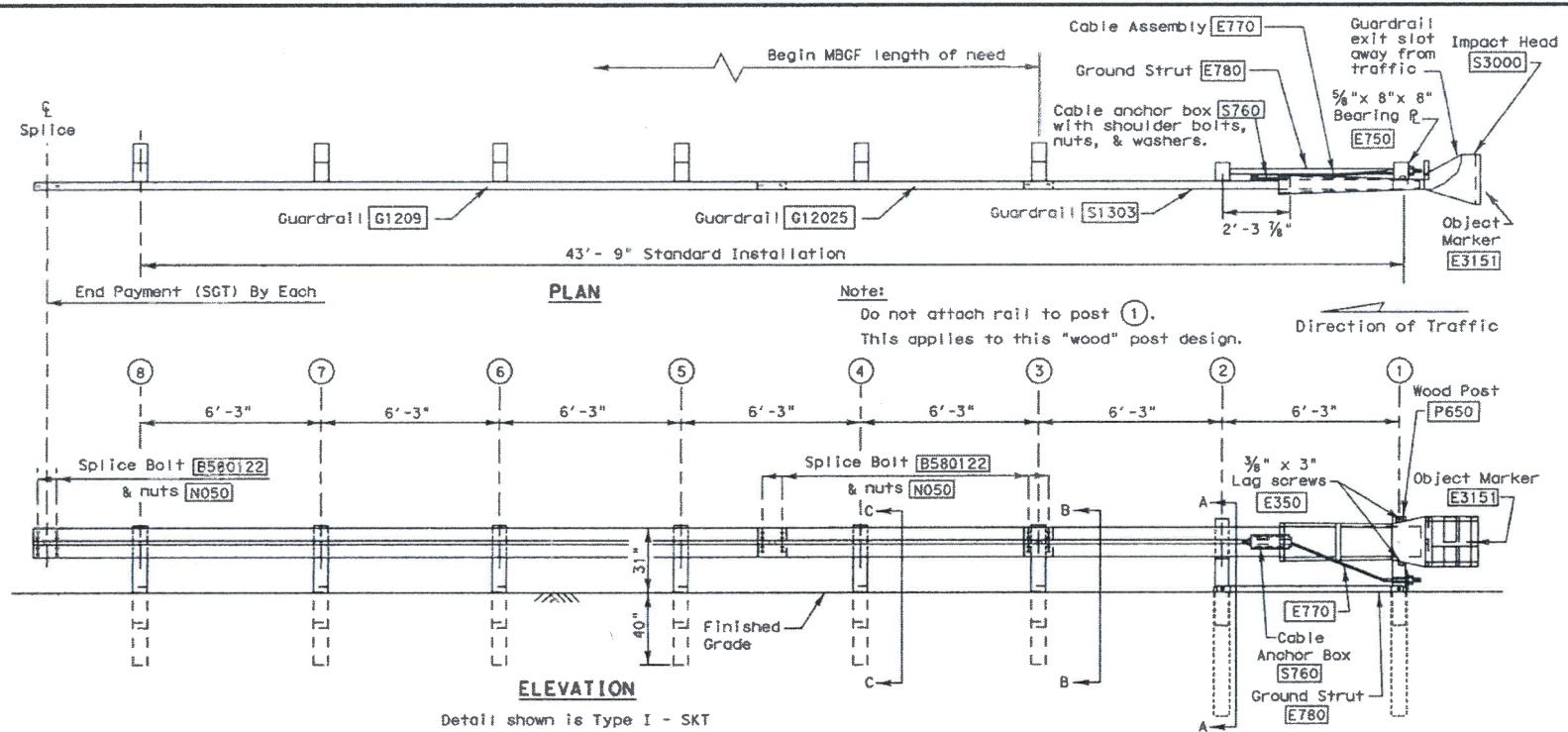
GENERAL NOTES

1. The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of transitions shall be as shown in the plans or as directed by the Engineer.
2. Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans.
3. Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut and Type A 1 1/4" O.D. washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" with 5/8" double recessed nuts (ASTM A563).
4. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item requiring construction of the transition.
5. Crown will be widened to accommodate transitions.
6. If solid rock is encountered. See the GF(31) standard sheet for the proper installation guidance.
7. Posts shall not be set in concrete, of any depth.
8. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT, maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL can furnish composite material posts and/or blocks.
9. Refer to GF(31) standard sheet for additional details.

		Design Division Standard	
METAL BEAM GUARD FENCE TRANSITION (TL-2) (Low Speed Transition)			
GF(31) TL2-11			
FILE: gf31tl211.dgn © TxDOT December 2011	DW: TxDOT CONT SECT	CKE: AM JOB	DW: BD HIGHWAY
REVISIONS			
	BIST	COUNTY	SHEET NO.

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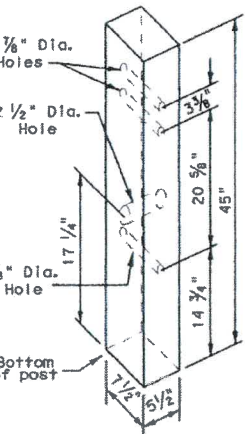
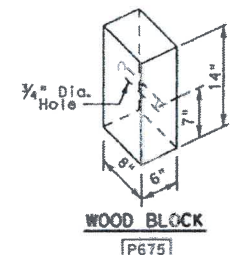


GENERAL NOTES

- For additional information contact: Interstate Steel Inc. (432) 263-3725
- The Type of SGT unit will be specified elsewhere in the plans. The numbers in the circles indicate post position. The Type of SGT unit chosen is a maintenance consideration and does not affect the systems performance.

Post & Tube Options		Post Only	
Type I Posts	① thru ②	Posts ③ thru ⑧	
Type II Posts	① thru ④	Posts ⑤ thru ⑧	
Type III Posts	① thru ⑧	None	
- SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius, without special fabrication.
- All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
- A flare rate of 25:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
- The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
- The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
- If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- The wood blocks shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks. The bearing plate on the front post shall also be "toe nailed" to prevent rotation.
- For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D&M(VIA).

Item #	POST & TUBE OPTIONS			DESCRIPTION
	Type I	Type II	Type III	
S1303	1	1	1	Guardrail (12 Ga.) 12'-6" SKT
G12025	1	1	1	Guardrail (12 Ga.) 9'-4 1/2"
G1209	1	1	1	Guardrail (12 Ga.) 25'-0"
S730	2	2	2	Steel Tube - 6" x 8" x 72" x 1/8" min. or 3/16"
S735	0	2	6	Steel Tube - 6" x 8" x 54" x 1/8" min. or 3/16"
P650	2	4	8	Wood Posts - 5 1/2" x 7 1/2" x 45"
P671	6	4	0	Wood CRT Posts - 6" x 8" x 72"
P675	6	6	6	Wood Block - 6" x 8" x 14"
E740	1	1	1	Pipe Sleeve - 2" Std. Pipe x 5 1/2"
E750	1	1	1	Bearing Plate - 5/8" x 8" x 8"
S760	1	1	1	Cable Anchor Box
E770	1	1	1	Cable Assembly
E780	1	1	1	Ground Strut
S3000	1	1	1	Impact Head
HARDWARE				
B580754	2	4	8	5/8" x 7 1/2" Hex Hd. Bolt
B581004	2	4	8	5/8" x 10" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	5/8" Washers
B581002	1	1	1	5/8" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	5/8" x 1 1/4" HGR Splice Bolt
B581802	6	6	6	5/8" x 18" HGR Post Bolt (Posts ② thru ⑧)
N050	35	39	47	5/8" HGR Nut (24-Spl, Varies-Posts, 2-Strut)
E350	2	2	2	3/8" x 3" Lag Screw
N100	2	2	2	1" Hex Nut (Anchor Cable)
W100	2	2	2	1" Washer (Anchor Cable)
SB12A	8	8	8	Cable Anchor Box Shoulder Bolts
N012A	8	8	8	1/2" Structural Nut
W012A	8	8	8	1/2" Structural Washer
E3151	1	1	1	Object Marker - (18" x 18")



All measurements should be taken from bottom of posts.
UNIVERSAL WOOD POST
P650

POST & TUBE OPTIONS	
Type I post	① thru ②
Type II post	① thru ④
Type III post	① thru ⑧

Texas Department of Transportation
Design Division Standard

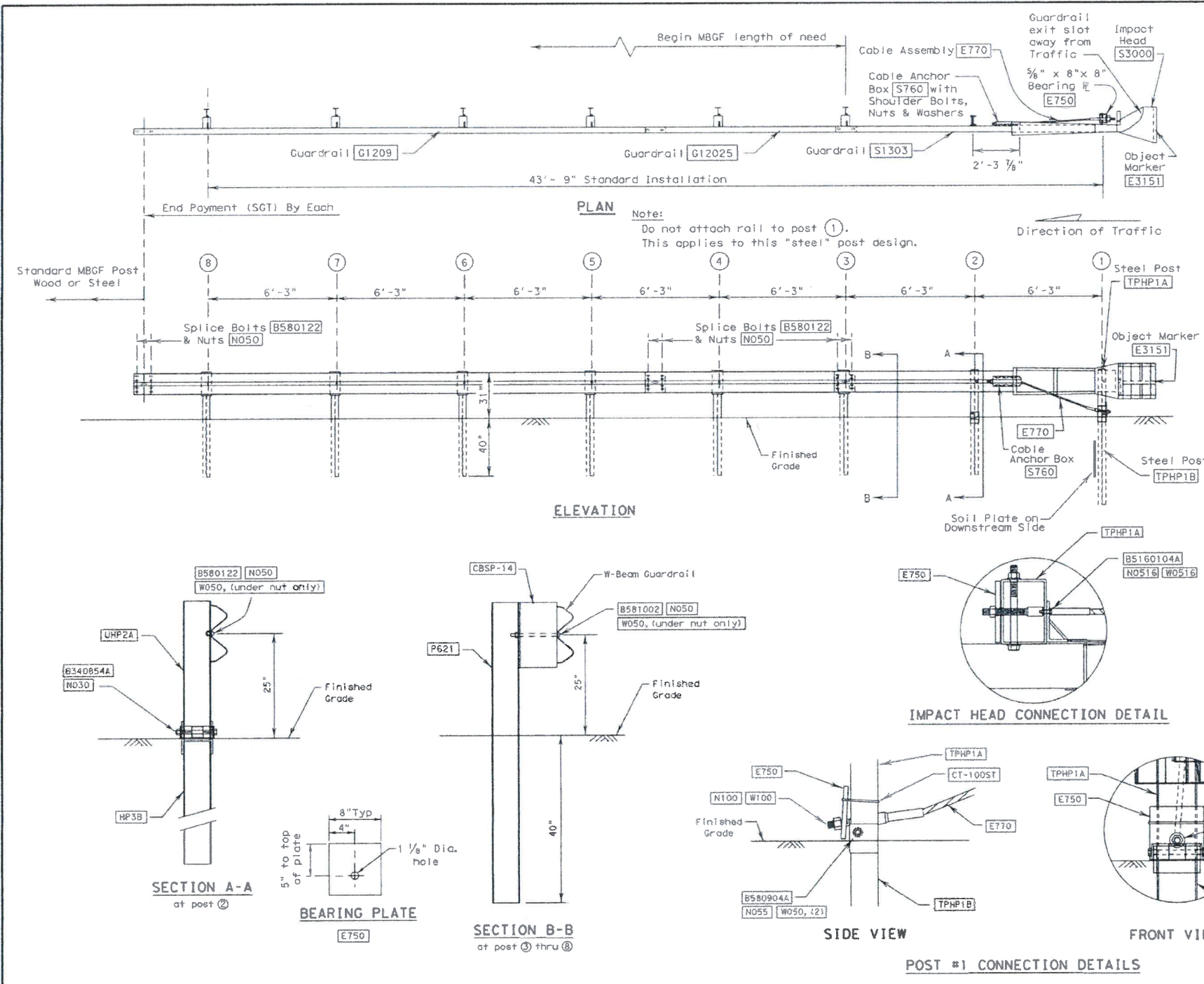
SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST)

SGT (8) 31-14

FILE: sgt183114.dgn	DWG: TxDOT	CHK: AM	DWG: 9D/VP	CK: VP
© TxDOT December 2011	CONY	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY	SHEET NO.		

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DATE: FILE:



GENERAL NOTES

- For additional information contact: Interstate Steel Inc., (432) 263-3725.
- All bolts, nuts cable assemblies, cable anchors, steel posts & bearing plates shall be galvanized.
- SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius without special fabrication.
- A flare rate of 25:1 may be used to prevent the terminal head from encroaching on the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
- The lower sections of the post shall not protrude more than 4 inches above finished ground. Site grading may be necessary to meet this requirement.
- The lower section of the steel posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- If solid rock is encountered. See manufacturer's installation manual for the proper installation guidance.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- Hinge bolts shall not be set below finished grade. At curb locations the posts shall be installed at the proper grade elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed as directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D&M(VIA).

ITEM NO.	QTY	BILL OF MATERIALS
S1303	1	GUARDRAIL (12 GA) 12' - 6" SKT Panel
G12025	1	GUARDRAIL (12 GA) 9' - 4 1/2"
G1209	1	GUARDRAIL (12 GA) 25' - 0"
TPHP1A	1	FIRST POST ASSEMBLY TOP, TUBE
TPHP1B	1	FIRST POST ASSEMBLY BOTTOM, 6' - 0"
UHP2A	1	SECOND POST ASSEMBLY TOP
HP3B	1	SECOND POST ASSEMBLY BOTTOM, 3' - 5 1/8"
P621	6	STANDARD STEEL LINE POST 6' - 0" (POST 3 THRU 8)
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
CT-100ST	1	CABLE TIE - STEEL
C BSP-14	6	ROUTED BLOCK
S3000	1	IMPACT HEAD
HARDWARE		
B580122	25	3/8" Dia. x 1 1/4" SPLICE BOLT
B580904A	1	3/8" Dia. x 9" HEX BOLT GR. 5
B340854A	1	3/4" Dia. x 8 1/2" HEX BOLT GR. 5
B581002	6	3/8" Dia. x 10" H.G.R. BOLT (Post 3 thru 8)
N055	1	3/8" Dia. HEX NUT (Post 1 only)
N050	31	3/8" Dia. H.G.R. NUT (at splices & at Post 2 thru 8)
W050	9	H.G.R. WASHER (At Post 1 (2) & 2 thru 8)
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B5160104A	2	3/8" x 1" HEX BOLT, GR. 5
N0516	2	3/8" HEX NUT
W0516	4	3/8" WASHER
SB12A	8	CABLE ANCHOR BOX SHOULDER BOLT
N030	1	3/4" HEX NUT
N012A	8	1/2" STR. NUT
W012A	8	1/2" STR. WASHER
E3151	1	OBJECT MARKER (18" x 18")

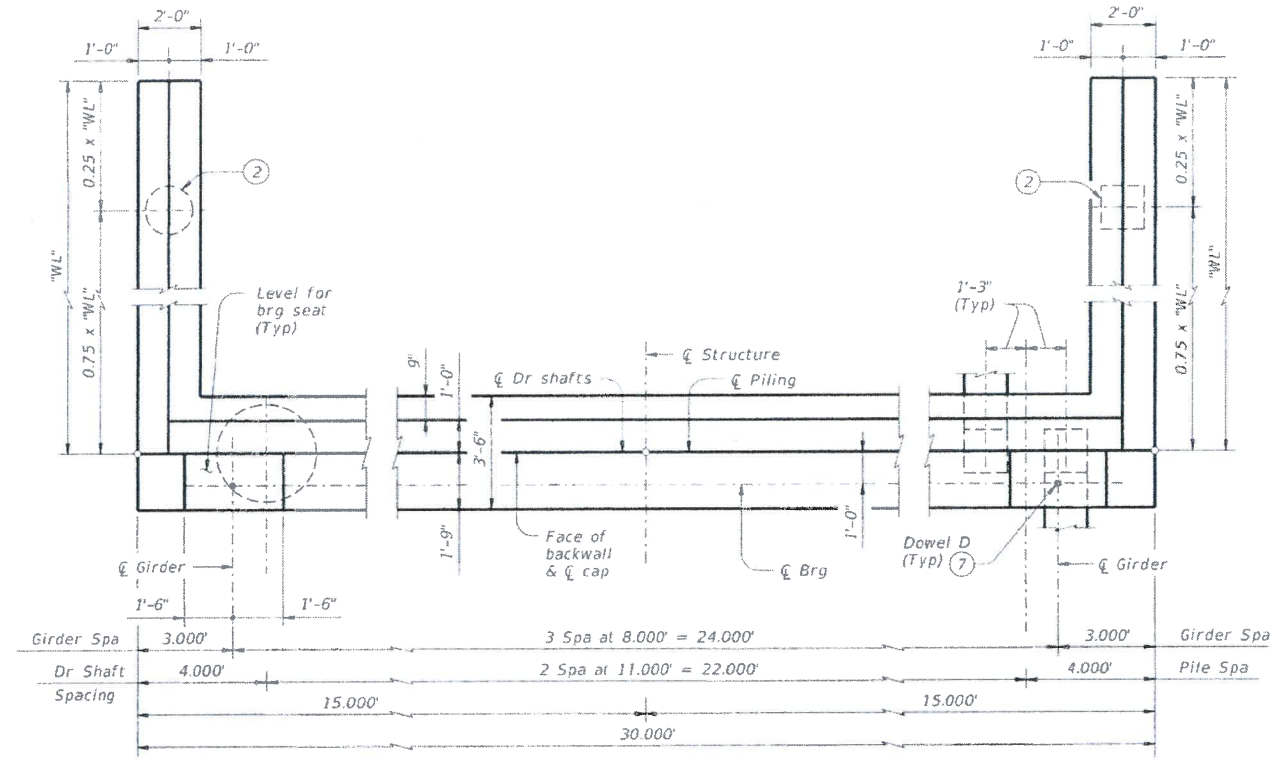
Texas Department of Transportation
Design Division Standard

SINGLE GUARDRAIL TERMINAL (SKT-31) (STEEL POST) SGT (8S) 31-14

FILE: sg18s314.dgn	DRW: TxDOT	CR: AM	CHK: BD/VP	EN: VP
©TxDOT December 2011	CONF: SECT	JOB	HIGHWAY	
REVISIONS				
DIST	COUNTY	SHEET NO.		

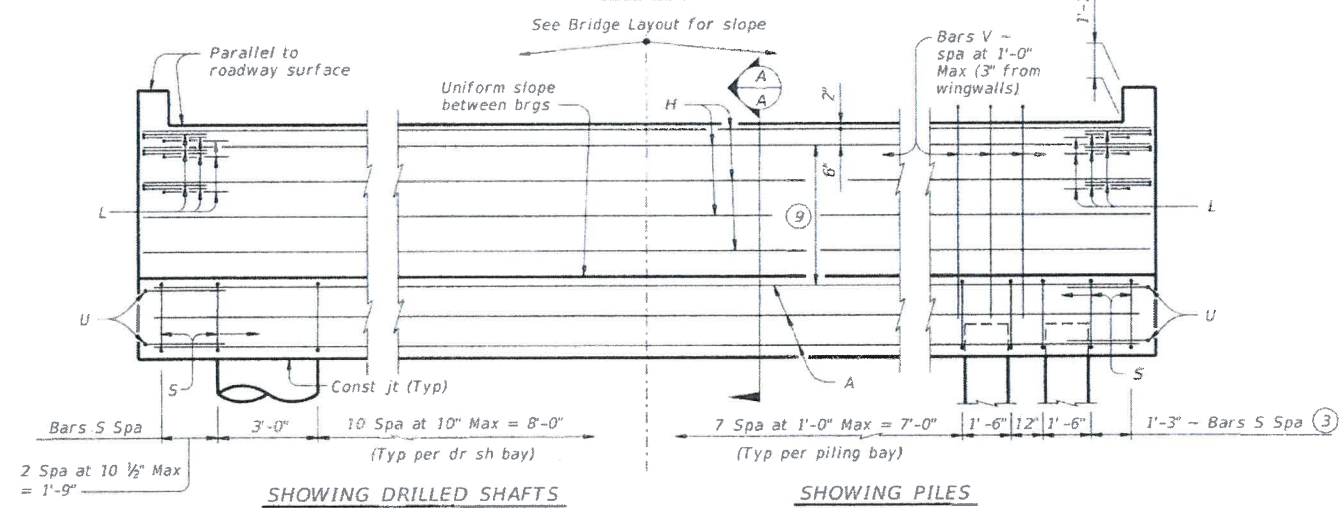
TABLE OF FOUNDATION LOADS

Span Length	All Girder Types	
	Tons/Shaft	Tons/Pile
40	67	61
45	72	63
50	76	65
55	80	67
60	85	69
65	89	72
70	93	74
75	97	76
80	101	78
85	105	80
90	109	82
95	113	84
100	117	86
105	121	88
110	125	90
115	129	92
120	133	94
125	137	96



SHOWING DRILLED SHAFTS SHOWING PILES

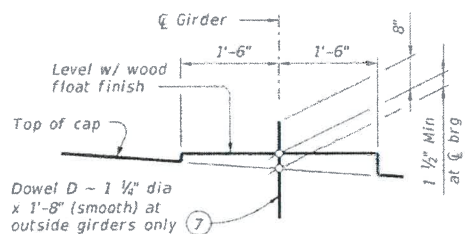
PLAN ①



SHOWING DRILLED SHAFTS SHOWING PILES

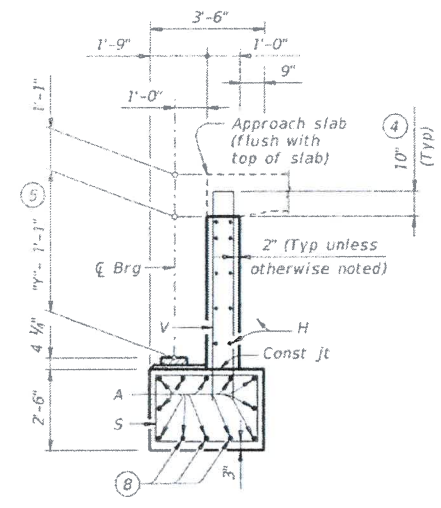
ELEVATION

Header Slope	Girder Type	Wingwall Type	Wingwall Lgth "WL"
2:1	Tx28	Cantilevered	8.000'
	Tx34	Cantilevered	9.000'
	Tx40	Cantilevered	10.000'
	Tx46	Cantilevered	11.000'
3:1	Tx54	Cantilevered	12.000'
	Tx28	Cantilevered	12.000'
	Tx34	Founded	13.000'
	Tx40	Founded	15.000'
	Tx46	Founded	16.000'
	Tx54	Founded	18.000'



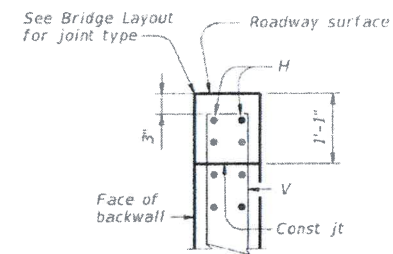
BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)



SECTION A-A

(With approach slab) ⑥



BACKWALL DETAIL

(Without approach slab) ⑥

- See Table A for variable dimensions based on header slope and girder type.
- See Table A to determine if wingwall foundations are required.
- For piling larger than 16" adjust Bars S spacing as required to avoid piling.
- Increase as required to maintain 3" from finished grade.
- See Span details for "Y" value.
- See Bridge Layout to determine if approach slab is present.
- Omit Dowels D at end of multi-span unit. Deduct 14 lbs from reinforcing steel total.
- With pile foundations, move Bars A shown to clear piles.
- Spacing based on girder type:
Tx28 - 3 Spaces at 1'-0" Max
Tx34 - 3 Spaces at 1'-0" Max
Tx40 - 4 Spaces at 1'-0" Max
Tx46 - 4 Spaces at 1'-0" Max
Tx54 - 5 Spaces at 1'-0" Max

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 See Bridge Layout for header slope and foundation type, size and length.
 See Common Foundation Details (FD) standard sheet for all foundation details and notes.
 See Concrete Riprap (CRR) standard sheet for riprap attachment details, if applicable.
 See applicable rail details for rail anchorage in wingwalls.
 These abutment details may be used with standard SIG-28 only.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

MATERIAL NOTES:
 Provide Class C concrete ($f'_c = 3,600$ psi).
 Provide Class C (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.

HL93 LOADING SHEET 1 OF 3

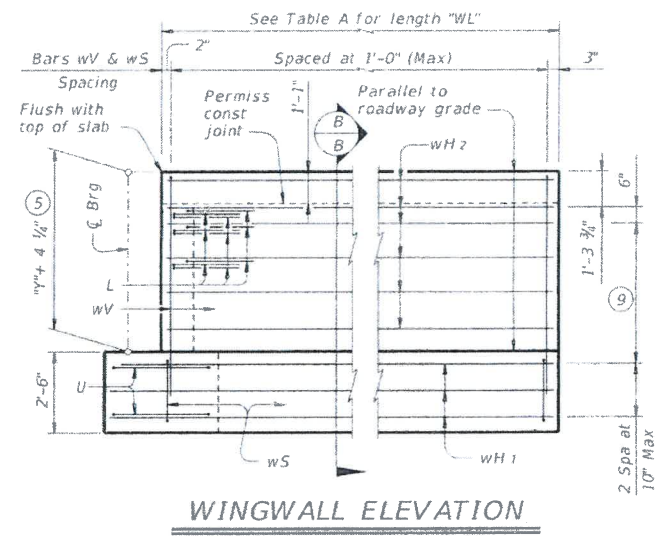
Texas Department of Transportation		Bridge Division Standard	
ABUTMENTS			
TYPE TX28 THRU TX54			
PRESTR CONC I-GIRDERS			
28' ROADWAY			
AIG-28			
FILE: aig05sts.dgn	DR: JMH	CR: NAW	DW: SFS
October 2015	CONV	SECT	JOB
REVISIONS	DIST	COUNTY	SHEET NO.

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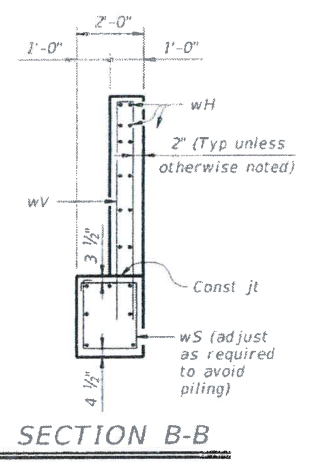
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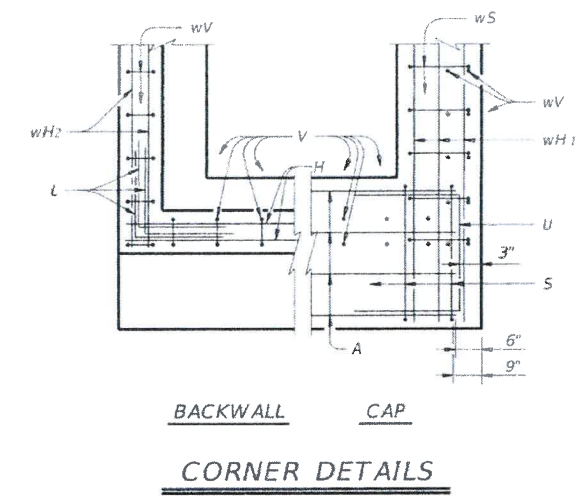
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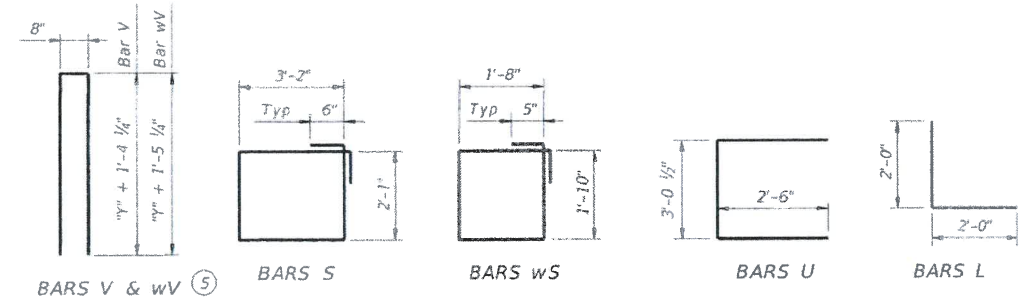
WINGWALL ELEVATION



SECTION B-B



**BACKWALL CAP
CORNER DETAILS**



- ⑤ See Span details for "Y" value.
- ⑨ Spacing based on girder type:
 Tx28 - 3 Spaces at 1'-0" Max
 Tx34 - 3 Spaces at 1'-0" Max
 Tx40 - 4 Spaces at 1'-0" Max
 Tx46 - 4 Spaces at 1'-0" Max
 Tx54 - 5 Spaces at 1'-0" Max

		Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 28' ROADWAY AIG-28			
FILE: aig05st1.dgn	DN: JMH	CK: BRH	DR: SFS
© TxDOT October 2015	CONT	SECT	JOB
REVISIONS			
DIST	COUNTY	SHEET NO	

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DATE: _____
 FILE: _____

TABLES OF ESTIMATED QUANTITIES WITH 2:1 HEADER SLOPE ^⑩


TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849					
D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14					
H	8	#6	29'-8"	356	H	8	#6	29'-8"	356	H	10	#6	29'-8"	446	H	10	#6	29'-8"	446	H	12	#6	29'-8"	535					
L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108					
S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336					
U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49					
V	29	#5	10'-0"	302	V	29	#5	11'-0"	333	V	29	#5	12'-0"	363	V	29	#5	13'-0"	393	V	29	#5	14'-4"	434					
wH1	14	#6	9'-5"	198	wH1	14	#6	10'-5"	219	wH1	14	#6	11'-5"	240	wH1	14	#6	12'-5"	261	wH1	14	#6	13'-5"	282					
wH2	20	#6	7'-8"	230	wH2	20	#6	8'-8"	260	wH2	24	#6	9'-8"	348	wH2	24	#6	10'-8"	385	wH2	28	#6	11'-8"	491					
wS	18	#4	7'-10"	94	wS	20	#4	7'-10"	105	wS	22	#4	7'-10"	115	wS	24	#4	7'-10"	126	wS	26	#4	7'-10"	136					
wV	18	#5	10'-2"	191	wV	20	#5	11'-2"	233	wV	22	#5	12'-2"	279	wV	24	#5	13'-2"	330	wV	26	#5	14'-6"	393					
Reinforcing Steel				Lb	3,727	Reinforcing Steel				Lb	3,862	Reinforcing Steel				Lb	4,147	Reinforcing Steel				Lb	4,297	Reinforcing Steel				Lb	4,627
Class "C" Concrete				CY	16.9	Class "C" Concrete				CY	18.4	Class "C" Concrete				CY	19.9	Class "C" Concrete				CY	21.6	Class "C" Concrete				CY	23.6

TABLES OF ESTIMATED QUANTITIES WITH 3:1 HEADER SLOPE ^⑩

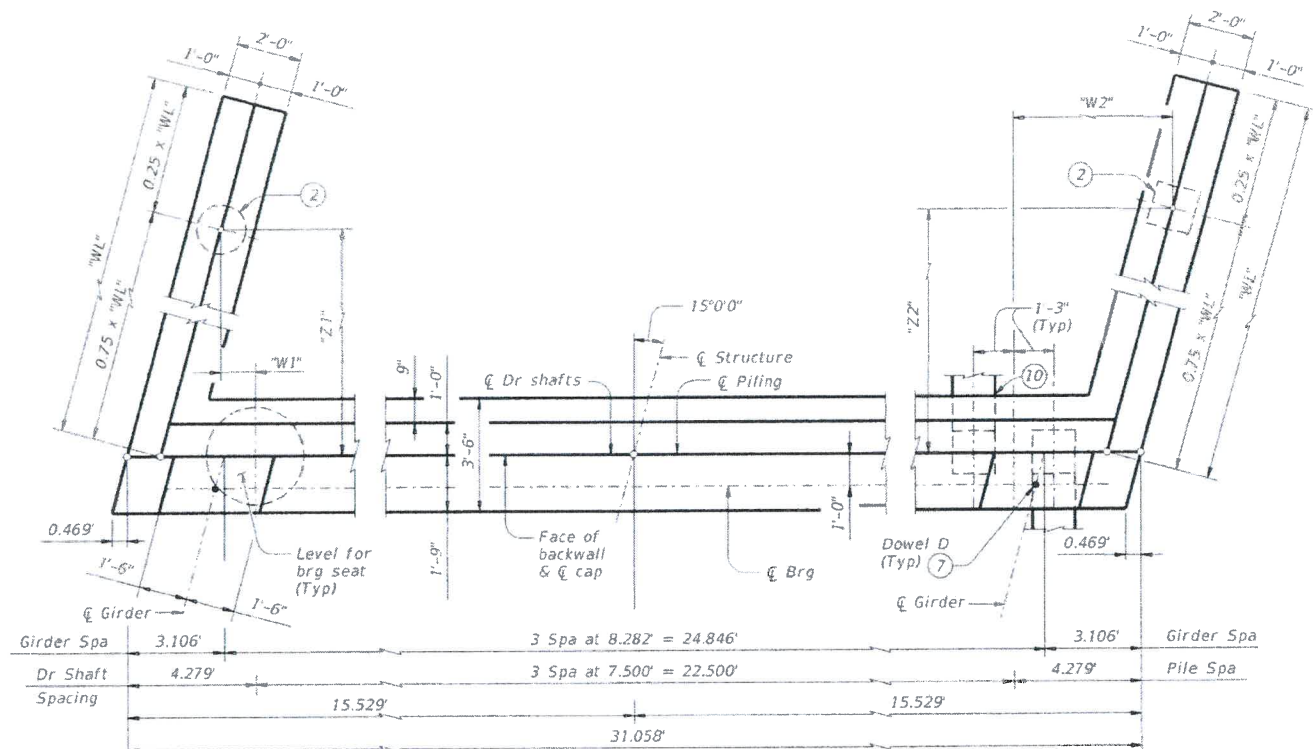
TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849	A	12	#11	29'-0"	1,849					
D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14	D ^⑦	2	1 1/4"D	1'-8"	14					
H	8	#6	29'-8"	356	H	8	#6	29'-8"	356	H	10	#6	29'-8"	446	H	10	#6	29'-8"	446	H	12	#6	29'-8"	535					
L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108	L	18	#6	4'-0"	108					
S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336	S	28	#5	11'-6"	336					
U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49	U	4	#6	8'-1"	49					
V	29	#5	10'-0"	302	V	29	#5	11'-0"	333	V	29	#5	12'-0"	363	V	29	#5	13'-0"	393	V	29	#5	14'-4"	434					
wH1	14	#6	13'-5"	282	wH1	14	#6	14'-5"	303	wH1	14	#6	16'-5"	345	wH1	14	#6	17'-5"	366	wH1	14	#6	19'-5"	408					
wH2	20	#6	11'-8"	350	wH2	20	#6	12'-8"	381	wH2	24	#6	14'-8"	529	wH2	24	#6	15'-8"	565	wH2	28	#6	17'-8"	743					
wS	26	#4	7'-10"	136	wS	28	#4	7'-10"	147	wS	32	#4	7'-10"	167	wS	34	#4	7'-10"	178	wS	38	#4	7'-10"	199					
wV	26	#5	10'-2"	276	wV	28	#5	11'-2"	326	wV	32	#5	12'-2"	406	wV	34	#5	13'-2"	467	wV	38	#5	14'-6"	575					
Reinforcing Steel				Lb	4,058	Reinforcing Steel				Lb	4,202	Reinforcing Steel				Lb	4,612	Reinforcing Steel				Lb	4,771	Reinforcing Steel				Lb	5,250
Class "C" Concrete				CY	19.4	Class "C" Concrete				CY	21.1	Class "C" Concrete				CY	23.5	Class "C" Concrete				CY	25.3	Class "C" Concrete				CY	28.4

⑦ Omit Dowels D at end of multi-span unit. Deduct 14 lbs from reinforcing steel total.

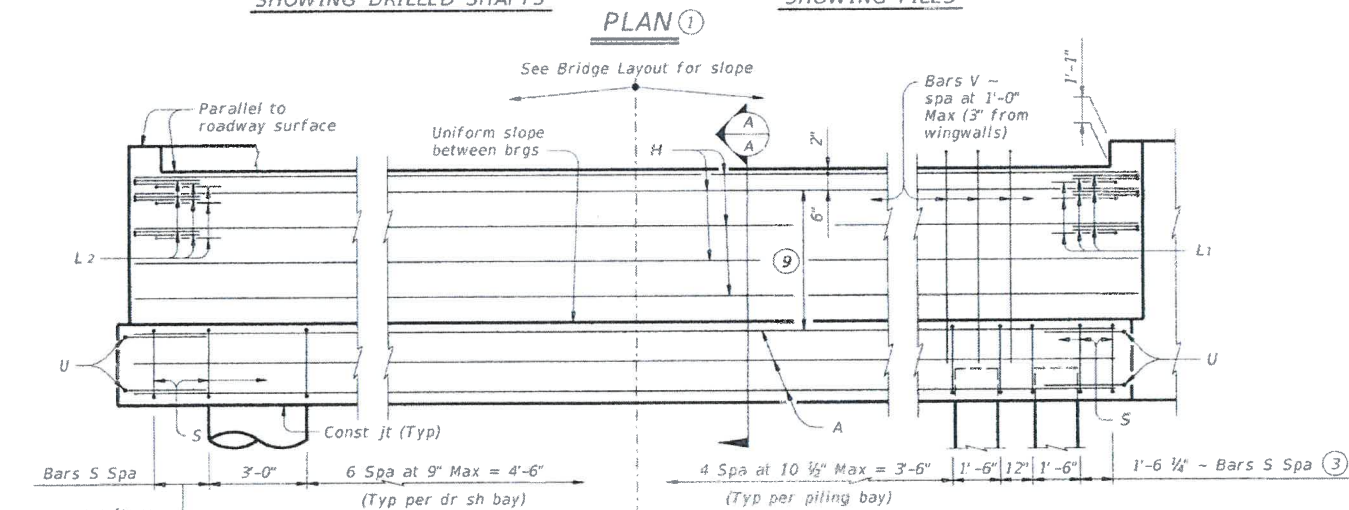
⑩ Quantities shown are for one abutment only (with approach slab). With no approach slab, add 1.1 CY Class "C" concrete and 178 lbs reinforcing steel for 4 additional Bars H.

 Texas Department of Transportation		Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 28' ROADWAY			
AIG-28			
FILE: aig05sls.dgn	DN: JNH	CC: NRN	DR: SFS
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REVISIONS	DIST	COUNTY	SHEET NO.

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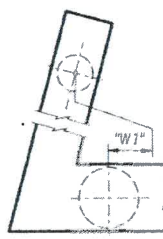


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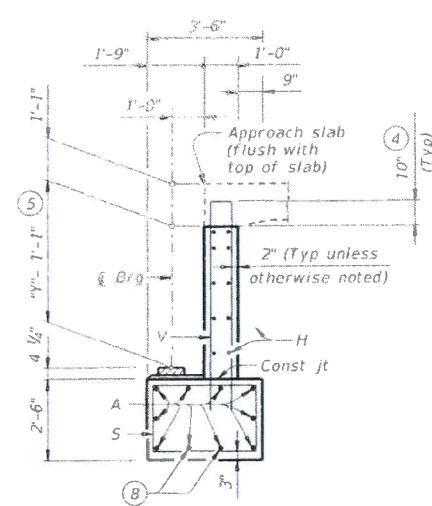
ELEVATION

Header Slope	Girder Type	Wingwall Type	Wingwall Lgth "WL"	"W1"	"Z1"	"W2"	"Z2"				
2:1	Tx28	Cantilevered	8.000'	Not Applicable							
	Tx34	Cantilevered	9.000'								
	Tx40	Cantilevered	10.000'								
	Tx46	Cantilevered	11.000'								
	Tx54	Founded	13.000'	0.720'	9.418'	5.767'	9.418'				
3:1	Tx28	Cantilevered	12.000'	Not Applicable							
	Tx34	Founded	14.000'					0.526'	10.142'	5.961'	10.142'
	Tx40	Founded	15.000'					0.332'	10.867'	6.156'	10.867'
	Tx46	Founded	17.000'					-0.056'	12.316'	6.544'	12.316'
	Tx54	Founded	19.000'					-0.444'	13.764'	6.932'	13.764'

Negative values for the "W1" dimension indicates a wingwall foundation on the other side of the cap foundation from what is shown in plan view. See Detail A.

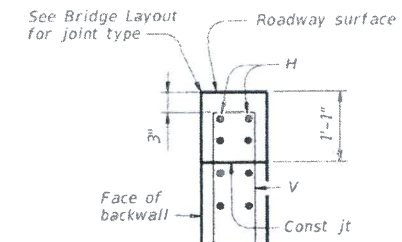


DETAIL A



SECTION A-A

(With approach slab) ④



BACKWALL DETAIL

(Without approach slab) ⑥

- ① See Table A for variable dimensions based on header slope and girder type.
- ② See Table A to determine if wingwall foundations are required.
- ③ For piling larger than 16" adjust Bars S spacing as required to avoid piling.
- ④ Increase as required to maintain 3" from finished grade.
- ⑤ See Span details for "y" value.
- ⑥ See Bridge Layout to determine if approach slab is present.
- ⑦ Omit Dowels D at end of multi-span unit. Deduct 14 lbs from reinforcing steel total.
- ⑧ With pile foundations, move Bars A shown to clear piles.
- ⑨ Spacing based on girder type:
Tx28 - 3 Spaces at 1'-0" Max
Tx34 - 3 Spaces at 1'-0" Max
Tx40 - 4 Spaces at 1'-0" Max
Tx46 - 4 Spaces at 1'-0" Max
Tx54 - 5 Spaces at 1'-0" Max
- ⑩ See Detail A on FD standard.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
See Bridge Layout for header slope and foundation type, size and length.
See Common Foundation Details (FD) standard sheet for all foundation details and notes.
See Concrete Riprap (CRR) standard sheet for riprap attachment details, if applicable.
See applicable rail details for rail anchorage in wingwalls.
Details are drawn showing right forward skew. See Bridge Layout for actual skew direction. These abutment details may be used with standard SIG-28-15 only.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

MATERIAL NOTES:

Provide Class C concrete ($f'c = 3,600$ psi).
Provide Class C (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.

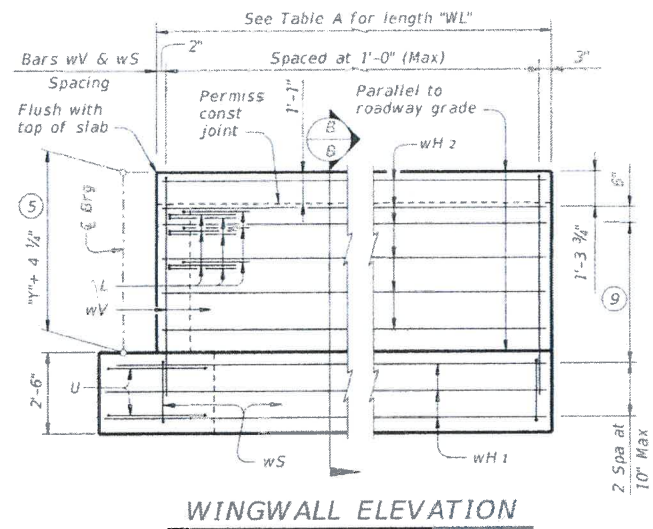
HL93 LOADING

SHEET 1 OF 3

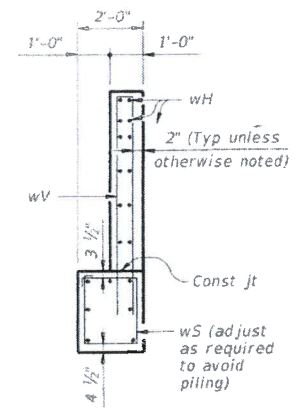
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AIG-28-15			
FILE: aig06sts.dgn	DM: JMH	CK: NRH	DR: SFS
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REVISIONS	DIST	COUNTY	SHEET NO.

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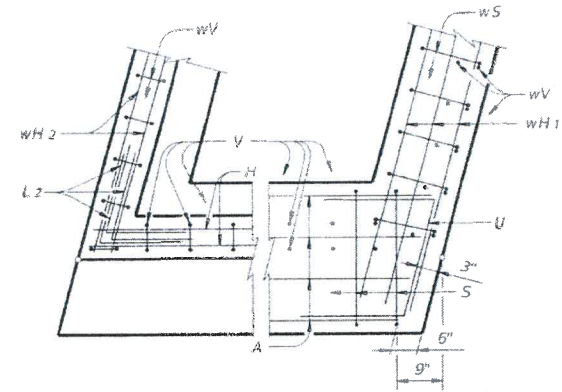
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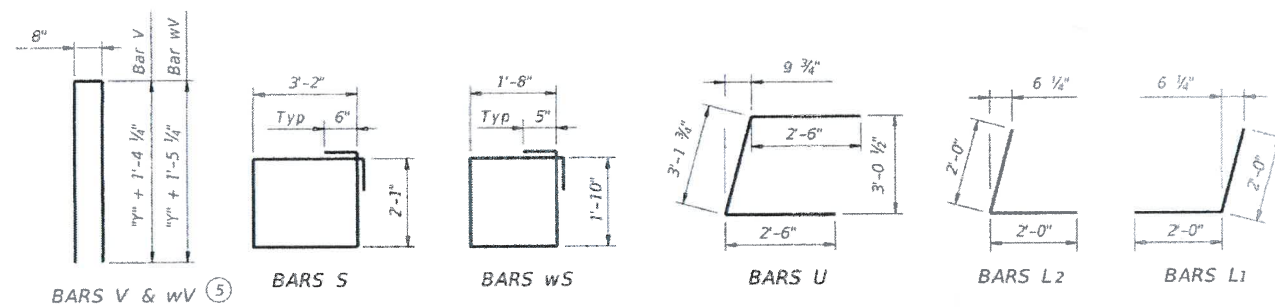
WINGWALL ELEVATION



SECTION B-B



BACKWALL CAP CORNER DETAILS



- 5 See Span details for "Y" value.
- 9 Spacing based on girder type:
 Tx28 - 3 Spaces at 1'-0" Max
 Tx34 - 3 Spaces at 1'-0" Max
 Tx40 - 4 Spaces at 1'-0" Max
 Tx46 - 4 Spaces at 1'-0" Max
 Tx54 - 5 Spaces at 1'-0" Max

		Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 28' ROADWAY 15° SKEW			
AIG-28-15			
FILE: aig06s1s.dgn	DN: JMH	CR: NRN	DR: SFS
©TxDOT October 2015	CONT	SECT	JOB HIGHWAY
REVISONS	DIST	COUNTY	SHEET NO.

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TABLES OF ESTIMATED QUANTITIES WITH 2:1 HEADER SLOPE (1)


TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598					
D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14					
H	8	#6	30'-9"	369	H	8	#6	30'-9"	369	H	10	#6	30'-9"	462	H	10	#6	30'-9"	462	H	12	#6	30'-9"	554					
L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54					
L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54					
S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324					
U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49					
V	30	#5	10'-0"	313	V	30	#5	11'-0"	344	V	30	#5	12'-0"	375	V	30	#5	13'-0"	407	V	30	#5	14'-4"	448					
wH1	14	#6	9'-5"	198	wH1	14	#6	10'-5"	219	wH1	14	#6	11'-5"	240	wH1	14	#6	12'-5"	261	wH1	14	#6	14'-5"	303					
wH2	20	#6	7'-8"	230	wH2	20	#6	8'-8"	260	wH2	24	#6	9'-8"	348	wH2	24	#6	10'-8"	385	wH2	28	#6	12'-8"	533					
wS	18	#4	7'-10"	94	wS	20	#4	7'-10"	105	wS	22	#4	7'-10"	115	wS	24	#4	7'-10"	126	wS	28	#4	7'-10"	147					
wV	18	#5	10'-2"	191	wV	20	#5	11'-2"	233	wV	22	#5	12'-2"	279	wV	24	#5	13'-2"	330	wV	28	#5	14'-6"	423					
Reinforcing Steel				Lb	3,488	Reinforcing Steel				Lb	3,623	Reinforcing Steel				Lb	3,912	Reinforcing Steel				Lb	4,064	Reinforcing Steel				Lb	4,501
Class "C" Concrete				CY	17.3	Class "C" Concrete				CY	18.8	Class "C" Concrete				CY	20.4	Class "C" Concrete				CY	22.1	Class "C" Concrete				CY	24.9

TABLES OF ESTIMATED QUANTITIES WITH 3:1 HEADER SLOPE (1)

TYPE Tx28 Girders					TYPE Tx34 Girders					TYPE Tx40 Girders					TYPE Tx46 Girders					TYPE Tx54 Girders									
Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight	Bar	No.	Size	Length	Weight					
A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598	A	10	#11	30'-1"	1,598					
D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14	D(7)	2	1 1/2"D	1'-8"	14					
H	8	#6	30'-9"	369	H	8	#6	30'-9"	369	H	10	#6	30'-9"	462	H	10	#6	30'-9"	462	H	12	#6	30'-9"	554					
L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54	L1	9	#6	4'-0"	54					
L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54	L2	9	#6	4'-0"	54					
S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324	S	27	#5	11'-6"	324					
U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49	U	4	#6	8'-2"	49					
V	30	#5	10'-0"	313	V	30	#5	11'-0"	344	V	30	#5	12'-0"	375	V	30	#5	13'-0"	407	V	30	#5	14'-4"	448					
wH1	14	#6	13'-5"	282	wH1	14	#6	15'-5"	324	wH1	14	#6	16'-5"	345	wH1	14	#6	18'-5"	387	wH1	14	#6	20'-5"	429					
wH2	20	#6	11'-8"	350	wH2	20	#6	13'-8"	411	wH2	24	#6	14'-8"	529	wH2	24	#6	16'-8"	601	wH2	28	#6	18'-8"	785					
wS	26	#4	7'-10"	136	wS	30	#4	7'-10"	157	wS	32	#4	7'-10"	167	wS	36	#4	7'-10"	188	wS	40	#4	7'-10"	209					
wV	26	#5	10'-2"	276	wV	30	#5	11'-2"	349	wV	32	#5	12'-2"	406	wV	36	#5	13'-2"	494	wV	40	#5	14'-6"	605					
Reinforcing Steel				Lb	3,819	Reinforcing Steel				Lb	4,047	Reinforcing Steel				Lb	4,377	Reinforcing Steel				Lb	4,632	Reinforcing Steel				Lb	5,123
Class "C" Concrete				CY	19.9	Class "C" Concrete				CY	22.2	Class "C" Concrete				CY	24.0	Class "C" Concrete				CY	26.6	Class "C" Concrete				CY	29.7

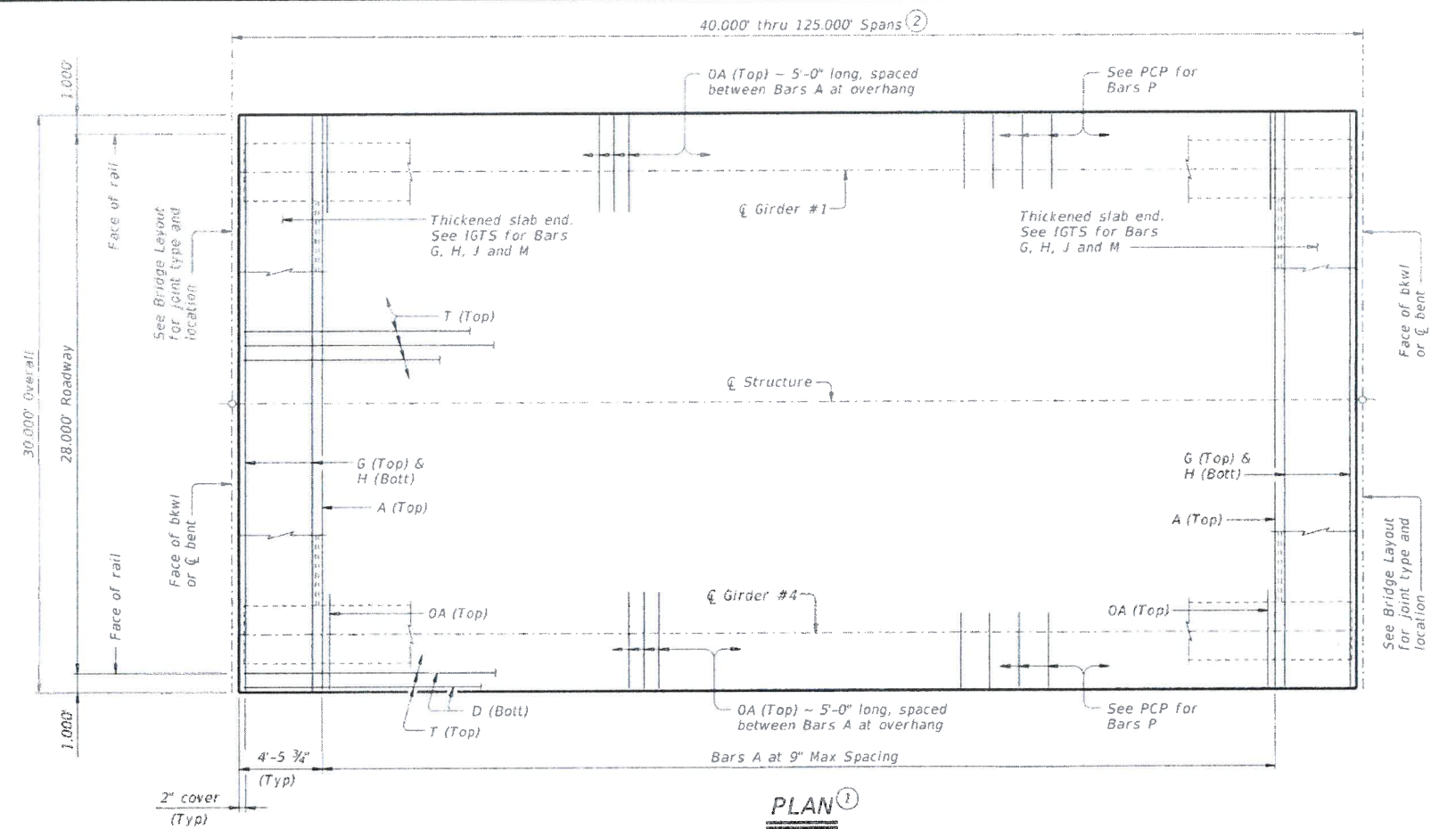
(7) Omit Dowels D at end of multi-span unit. Deduct 14 lbs from reinforcing steel total.

(1) Quantities shown are for one abutment only (with approach slab). With no approach slab, add 1.2 CY Class "C" concrete and 185 lbs reinforcing steel for 4 additional Bars H.

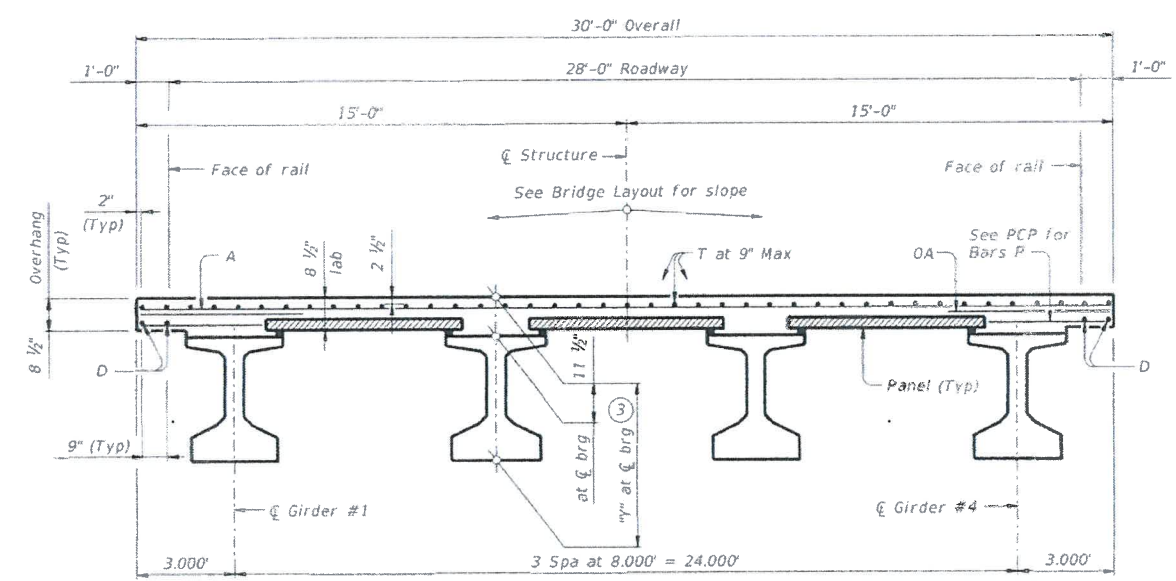
 Texas Department of Transportation		Bridge Division Standard	
ABUTMENTS TYPE TX28 THRU TX54 PRESTR CONC I-GIRDERS 28' ROADWAY 15° SKEW			
AIG-28-15			
FILE: aig06sts.dgn	DN: JWH	CK: HRN	DW: SFS
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PLAN



TYPICAL TRANSVERSE SECTION
(Showing girder type Tx46)

TABLE OF SECTION DEPTHS	
GIRDER TYPE	"Y" AT CENTERLINE BRIDGE
	Ft/In
Tx28	3'-3 1/2"
Tx34	3'-9 1/2"
Tx40	4'-3 1/2"
Tx46	4'-9 1/2"
Tx54	5'-5 1/2"

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

- ① If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.
- ② Span lengths for prestressed concrete I-Girder Type:
 Type Tx28 for spans lengths 40,000' thru 70,000'.
 Type Tx34 for spans lengths 40,000' thru 85,000'.
 Type Tx40 for spans lengths 40,000' thru 95,000'.
 Type Tx46 for spans lengths 40,000' thru 105,000'.
 Type Tx54 for spans lengths 40,000' thru 125,000'.
- ③ "Y" value shown is based on theoretical beam camber, dead load deflection from an 8 1/2" concrete slab and a constant roadway grade. The Contractor will adjust this value as necessary for any roadway vertical curve.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 28' ROADWAY

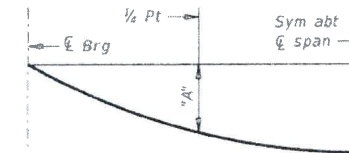
SIG-28

FILE: sig05st5.dgn	DR: JNH	CK: NRN	DW: SFS	CR: DKC
October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	

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TABLE OF DEAD LOAD DEFLECTIONS

TYPE Tx28 GIRDERS			TYPE Tx34 GIRDERS			TYPE Tx40 GIRDERS			TYPE Tx46 GIRDERS			TYPE Tx54 GIRDERS		
SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft
40	0.009	0.013	40	0.006	0.008	40	0.004	0.005	40	0.002	0.003	40	0.001	0.002
45	0.015	0.021	45	0.009	0.012	45	0.006	0.008	45	0.004	0.006	45	0.003	0.004
50	0.024	0.033	50	0.014	0.019	50	0.009	0.013	50	0.006	0.009	50	0.004	0.006
55	0.034	0.048	55	0.020	0.028	55	0.014	0.019	55	0.009	0.013	55	0.006	0.008
60	0.048	0.068	60	0.029	0.041	60	0.019	0.027	60	0.013	0.018	60	0.009	0.012
65	0.068	0.095	65	0.041	0.057	65	0.026	0.037	65	0.018	0.025	65	0.012	0.017
70	0.092	0.129	70	0.055	0.077	70	0.036	0.050	70	0.024	0.034	70	0.016	0.023
			75	0.073	0.102	75	0.048	0.067	75	0.033	0.046	75	0.021	0.030
			80	0.095	0.134	80	0.062	0.087	80	0.043	0.060	80	0.028	0.039
			85	0.122	0.171	85	0.080	0.112	85	0.054	0.076	85	0.036	0.050
						90	0.101	0.142	90	0.068	0.096	90	0.046	0.064
						95	0.126	0.177	95	0.085	0.120	95	0.057	0.080
									100	0.105	0.148	100	0.070	0.098
									105	0.129	0.181	105	0.085	0.120
									110			110	0.103	0.145
									115			115	0.123	0.173
									120			120	0.147	0.206
									125			125	0.173	0.243



DEAD LOAD DEFLECTION DIAGRAM

Calculated deflections shown are due to the concrete slab on interior girders only ($E_c = 5000$ ksi). Adjust values as required for exterior girders and if optional slab forming is used. These values may require field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB	Prestressed Concrete Girders			TOTAL REINF STEEL ⁵
		ABUT TO INT BT ⁴	INT BT TO INT BT ⁴	ABUT TO ABUT ⁴	
Ft	SF	LF	LF	LF	Lb
40	1,200	158.00	158.00	158.00	2,760
45	1,350	178.00	178.00	178.00	3,105
50	1,500	198.00	198.00	198.00	3,450
55	1,650	218.00	218.00	218.00	3,795
60	1,800	238.00	238.00	238.00	4,140
65	1,950	258.00	258.00	258.00	4,485
70	2,100	278.00	278.00	278.00	4,830
75	2,250	298.00	298.00	298.00	5,175
80	2,400	318.00	318.00	318.00	5,520
85	2,550	338.00	338.00	338.00	5,865
90	2,700	358.00	358.00	358.00	6,210
95	2,850	378.00	378.00	378.00	6,555
100	3,000	398.00	398.00	398.00	6,900
105	3,150	418.00	418.00	418.00	7,245
110	3,300	438.00	438.00	438.00	7,590
115	3,450	458.00	458.00	458.00	7,935
120	3,600	478.00	478.00	478.00	8,280
125	3,750	498.00	498.00	498.00	8,625

- ⁴ Fabricator will adjust lengths for girder slopes as required.
- ⁵ Reinforcing steel weight is calculated using an approximate factor of 2.3 Lbs/SF.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Multi-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet and standard IGCS.
See IGTS standard for Thickened Slab End details and quantity adjustments.
See PCP and PCP-FAB for panel details not shown.
See IGMS standard for miscellaneous details.
See applicable rail details for rail anchorage in slab.
See PMDF standard for details and quantity adjustments if this option is used.
This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class 5 concrete ($f'_c = 4,000$ psi).
Provide Class 5 (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:
Uncoated - #4 = 1'-5"
Epoxy Coated - #4 = 2'-1".
Deformed welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A, D, OA, P or T unless noted otherwise.

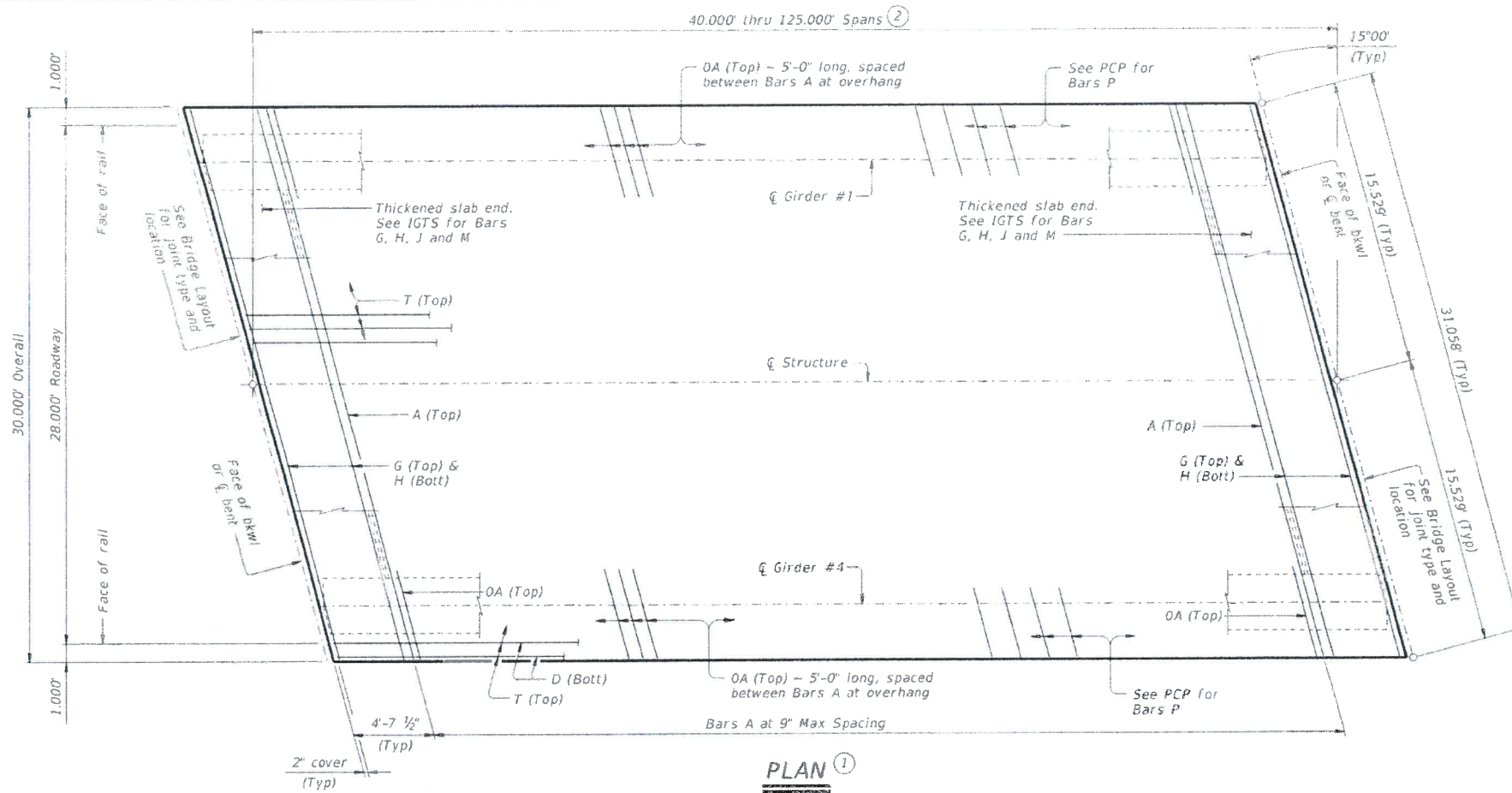
HL93 LOADING SHEET 2 OF 2

<p>PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 28' ROADWAY</p>			
<p>SIG-28</p>			
FILE: sig05sls.dgn	DR: JMH	CK: NRN	DW: SFS
©TxDOT October 2015	COPI: SEC1	JOB:	HIGHWAY:
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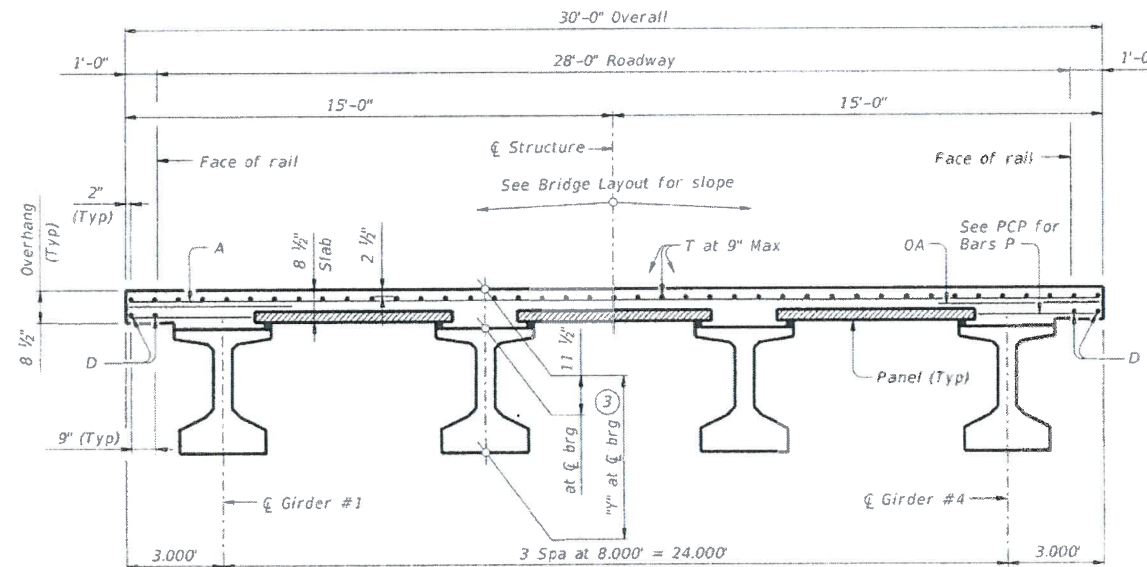
BAR TABLE

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#6
T	#4



PLAN 1

- ① If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities.
- ② Span lengths for prestressed concrete I-Girder type:
 Type Tx28 for spans lengths 40,000' thru 70,000'.
 Type Tx34 for spans lengths 40,000' thru 85,000'.
 Type Tx40 for spans lengths 40,000' thru 95,000'.
 Type Tx46 for spans lengths 40,000' thru 105,000'.
 Type Tx54 for spans lengths 40,000' thru 125,000'.
- ③ "y" value shown is based on theoretical beam camber, dead load deflection from an 8 1/2" concrete slab and a constant roadway grade. The Contractor will adjust this value as necessary for any roadway vertical curve.



TYPICAL TRANSVERSE SECTION
(Showing girder type Tx46)

TABLE OF SECTION DEPTHS

GIRDER TYPE	"y" AT \bar{C} BRG ③
	Ft/In
Tx28	3'-3 1/2"
Tx34	3'-9 1/2"
Tx40	4'-3 1/2"
Tx46	4'-9 1/2"
Tx54	5'-5 1/2"

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS (TYPE Tx28 THRU Tx54) 28' ROADWAY 15° SKEW

SIG-28-15

FILE: sig06sts.dgn	DR: JMH	CC: HRN	DW: SFS	CR: DKC
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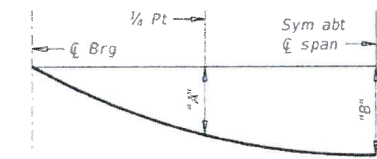
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TABLE OF DEAD LOAD DEFLECTIONS

TYPE Tx28 GIRDERS			TYPE Tx34 GIRDERS			TYPE Tx40 GIRDERS			TYPE Tx46 GIRDERS			TYPE Tx54 GIRDERS		
SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"	SPAN LENGTH	"A"	"B"
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft
40	0.009	0.013	40	0.006	0.008	40	0.004	0.005	40	0.002	0.003	40	0.001	0.002
45	0.015	0.021	45	0.009	0.012	45	0.006	0.008	45	0.004	0.006	45	0.003	0.004
50	0.024	0.033	50	0.014	0.019	50	0.009	0.013	50	0.006	0.009	50	0.004	0.006
55	0.034	0.048	55	0.020	0.028	55	0.014	0.019	55	0.009	0.013	55	0.006	0.008
60	0.048	0.068	60	0.029	0.041	60	0.019	0.027	60	0.013	0.018	60	0.009	0.012
65	0.068	0.095	65	0.041	0.057	65	0.026	0.037	65	0.018	0.025	65	0.012	0.017
70	0.092	0.129	70	0.055	0.077	70	0.036	0.050	70	0.024	0.034	70	0.016	0.023
			75	0.073	0.102	75	0.048	0.067	75	0.033	0.046	75	0.021	0.030
			80	0.095	0.134	80	0.062	0.087	80	0.043	0.060	80	0.028	0.039
			85	0.122	0.171	85	0.080	0.112	85	0.054	0.076	85	0.036	0.050
						90	0.101	0.142	90	0.068	0.096	90	0.046	0.064
						95	0.126	0.177	95	0.085	0.120	95	0.057	0.080
									100	0.105	0.148	100	0.070	0.098
									105	0.129	0.181	105	0.085	0.120
									110	0.103	0.145	110	0.103	0.145
									115	0.123	0.173	115	0.123	0.173
									120	0.147	0.206	120	0.147	0.206
									125	0.173	0.243	125	0.173	0.243



DEAD LOAD DEFLECTION DIAGRAM

Calculated deflections shown are due to the concrete slab on interior girders only ($E_c = 5000$ ksi). Adjust values as required for exterior girders and if optional slab forming is used. These values may require field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB	Prestressed Concrete Girders			TOTAL REINF STEEL ⁽⁵⁾
		ABUT TO INT BT ⁽⁴⁾	INT BT TO INT BT ⁽⁴⁾	ABUT TO ABUT ⁽⁴⁾	
Ft	SF	LF	LF	LF	Lb
40	1,200	157.96	158.00	157.93	2,760
45	1,350	177.96	178.00	177.93	3,105
50	1,500	197.96	198.00	197.93	3,450
55	1,650	217.96	218.00	217.93	3,795
60	1,800	237.96	238.00	237.93	4,140
65	1,950	257.96	258.00	257.93	4,485
70	2,100	277.96	278.00	277.93	4,830
75	2,250	297.96	298.00	297.93	5,175
80	2,400	317.96	318.00	317.93	5,520
85	2,550	337.96	338.00	337.93	5,865
90	2,700	357.96	358.00	357.93	6,210
95	2,850	377.96	378.00	377.93	6,555
100	3,000	397.96	398.00	397.93	6,900
105	3,150	417.96	418.00	417.93	7,245
110	3,300	437.96	438.00	437.93	7,590
115	3,450	457.96	458.00	457.93	7,935
120	3,600	477.96	478.00	477.93	8,280
125	3,750	497.96	498.00	497.93	8,625

- ⁽⁴⁾ Fabricator will adjust lengths for girder slopes as required.
- ⁽⁵⁾ Reinforcing steel weight is calculated using an approximate factor of 2.3 Lbs/SF.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
 Multi-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet and standard IGCS.
 See IGTS standard for Thickened Slab End details and quantity adjustments.
 See PCP and PCP-FAB for panel details not shown.
 See IGMS standard for miscellaneous details.
 See applicable rail details for rail anchorage in slab.
 See PMDF standard for details and quantity adjustments if this option is used.
 This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.
 This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class 5 concrete ($f'_c = 4,000$ psi).
 Provide Class 5 (HPC) concrete if shown elsewhere in the plans.
 Provide Grade 60 reinforcing steel.
 Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-5"
 Epoxy Coated ~ #4 = 2'-1".
 Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A, D, OA, P or T unless noted otherwise.

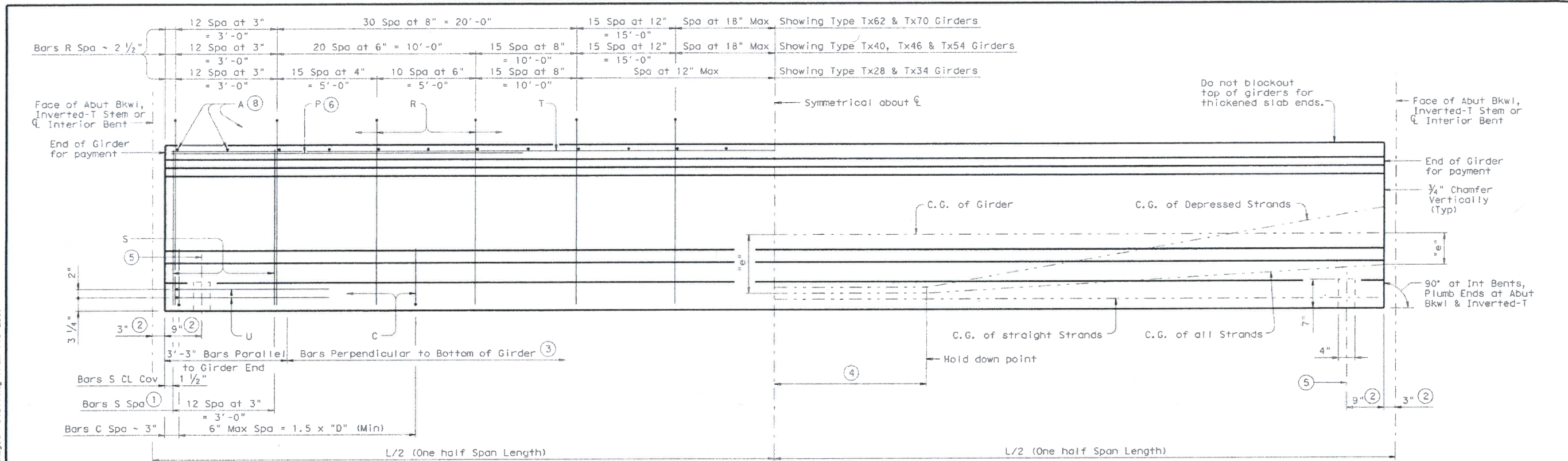
Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER SPANS
 (TYPE Tx28 THRU Tx54)
 28' ROADWAY 15° SKEW

SIG-28-15

FILE: sig06sls.dgn	DN: JHN	CR: NRN	DW: SFS	CK: DKC
©TxDOT October 2015	COMP	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY	SHEET NO.	



- ① Bundle with Bars R.
- ② Measured along C of Girder at Interior Bents; perpendicular to Abutment Bkwl or Inverted-T Stem.
- ③ The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

GIRDER ELEVATION

- ④ L/20, but not less than 5'-0" (-0, +2').
- ⑤ 4" x 1 1/2" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 3/4" x 1 5/8") at base. If holes are formed with sheet metal, forms may be left in place.
- ⑥ Bars P (#6 x 15'-0") are only required when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- ⑦ 1 3/8" Clear Cover to Bars S.
- ⑧ Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

GIRDER DIMENSIONS AND SECTION PROPERTIES								
Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in. ²)	"Ix" (in. ⁴)	"Iy" (in. ⁴)	Weight (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	610
Tx34	34	12	18.49	15.51	627	88,355	40,731	653
Tx40	40	18	21.90	18.10	669	134,990	40,902	697
Tx46	46	22	25.90	20.10	761	198,089	46,478	793
Tx54	54	30	30.49	23.51	817	299,740	46,707	851
Tx62	62	37 1/2	33.72	28.28	910	463,072	57,351	948
Tx70	70	45 1/2	38.09	31.91	966	628,747	57,579	1,006

GENERAL NOTES:
 Designed in accordance with AASHTO LRFD Specifications. All concrete must be Class H. Provide Class H(HPC) if shown elsewhere in plans.
 All reinforcing bars must be Grade 60.
 An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A497) may be substituted for Bars A, C, R or T unless otherwise noted.
 It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

Texas Department of Transportation
Bridge Division

PRESTRESSED CONCRETE
I-GIRDER DETAILS

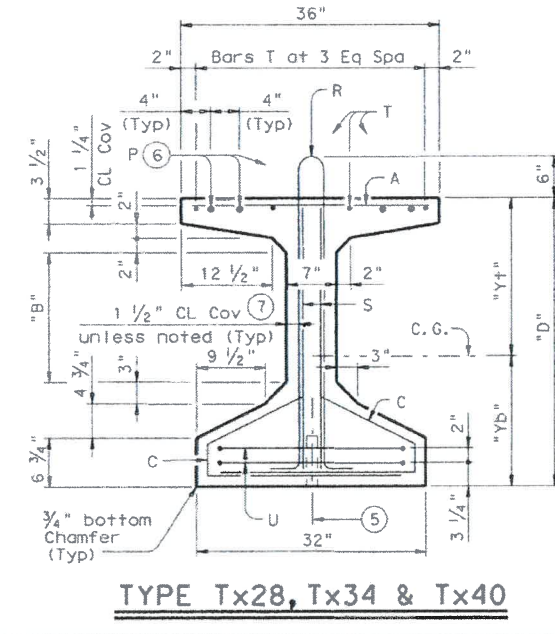
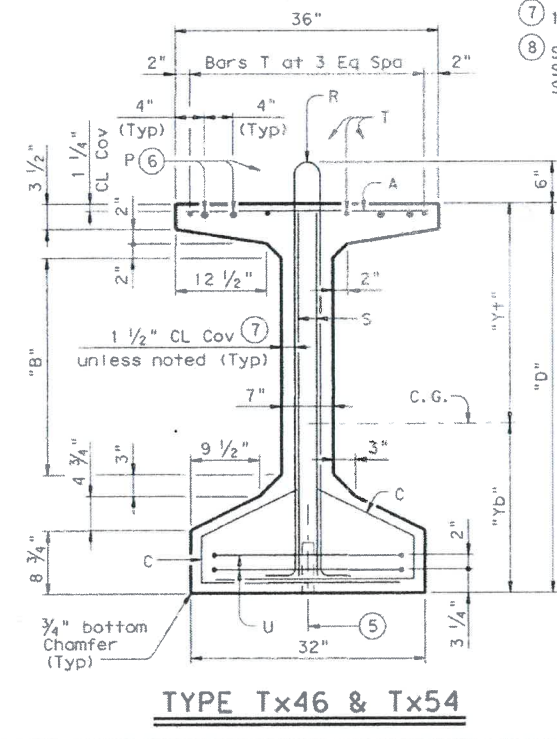
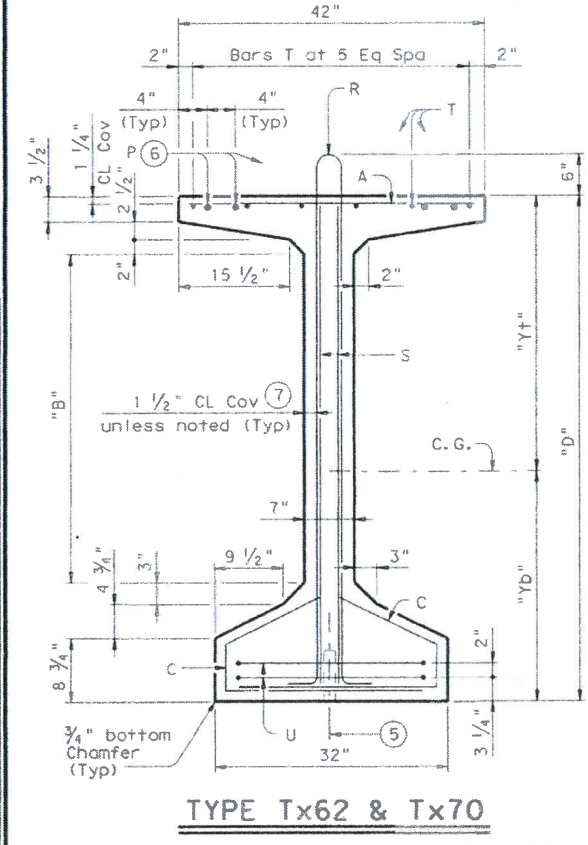
IGD

FILE: igdstdet.dgn	DW: Tx00T	CC: JMH	DW: JTR	CK: JMH
© TxDOT June 2007	DISTRICT:	FEDERAL A10 PROJECT		SHEET
REVISIONS				
02/09 General Notes				
12/10 Optional Top Flange Reinforcing				
COUNTY:	CONTROL SECT:	JOB:	HIGHWAY:	

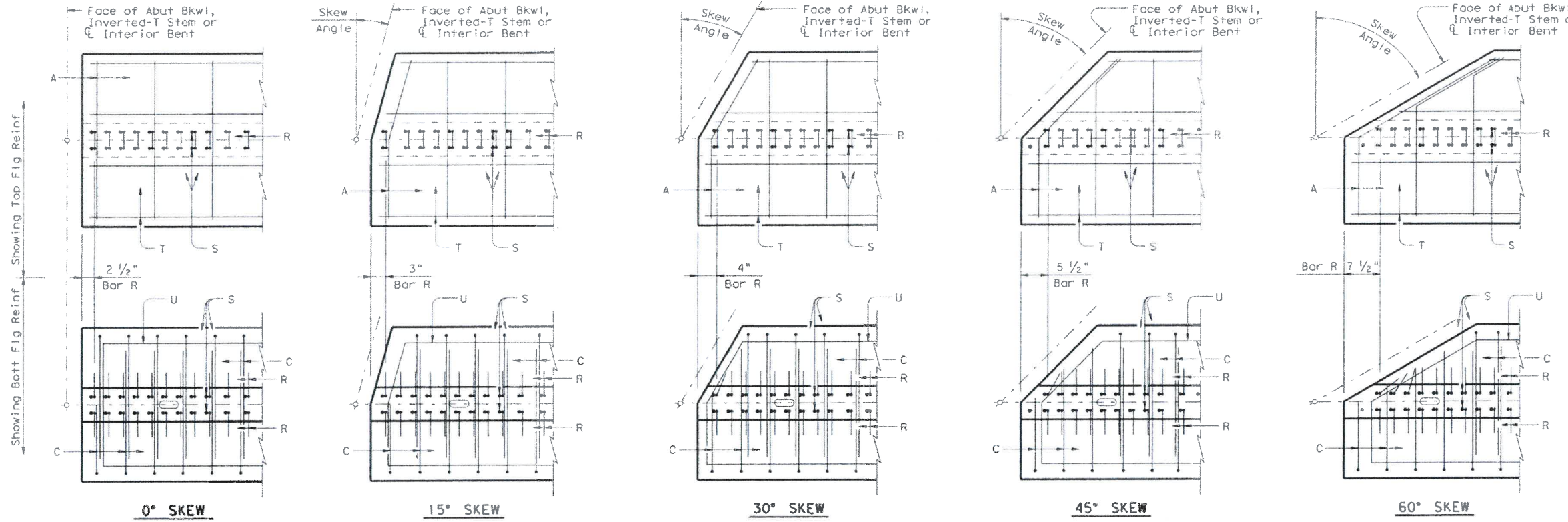
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LEVELS DISPLAYED

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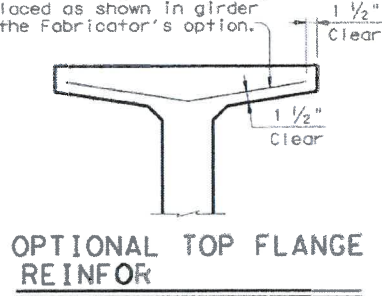


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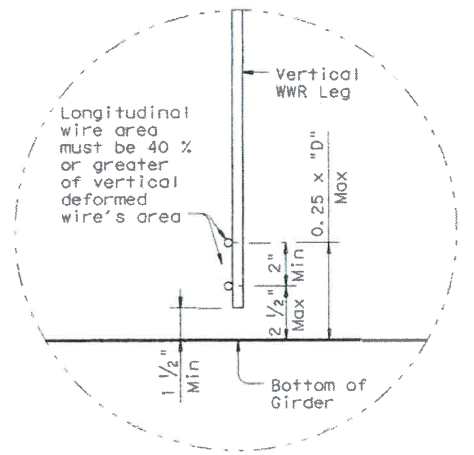
PLAN OF GIRDER ENDS⁹

To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.

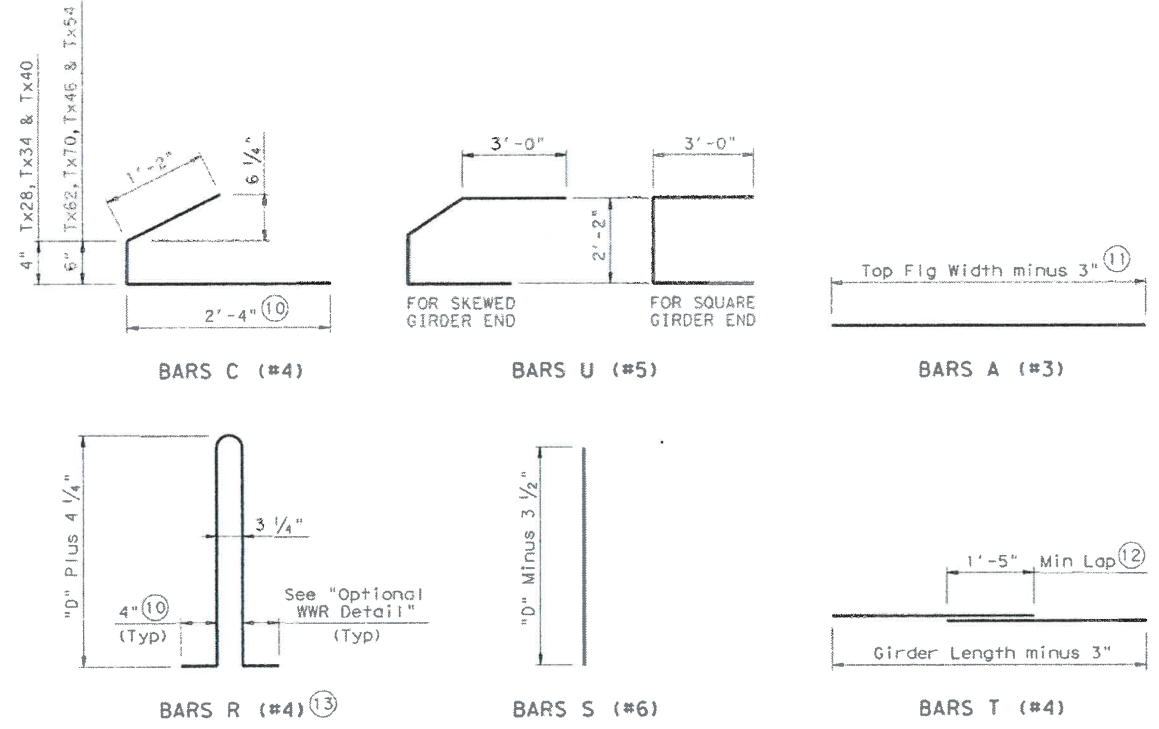


OPTIONAL TOP FLANGE REINFOR

- ⑨ Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- ⑩ Bars may be cut or bent at skewed end as required.
- ⑪ Increase as necessary for bars at skewed end.
- ⑫ No portion of bar less than 10 ft.
- ⑬ For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.



OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



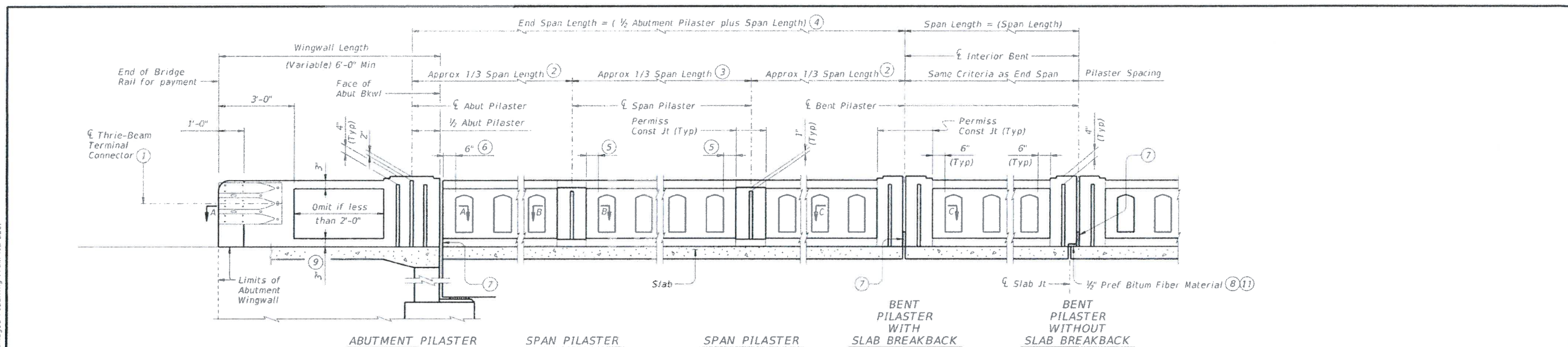
Texas Department of Transportation
Bridge Division
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: igdstdel.dgn	By: TxDOT	Chk: JNH	Dr: JTR	Cr: JNH
© TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT	SHEET	
REVISIONS				
02/09 General Notes, 12/10 Optional Top Flange Reinforcing.	COUNTY	CONTROL SECT	JOB	HIGHWAY

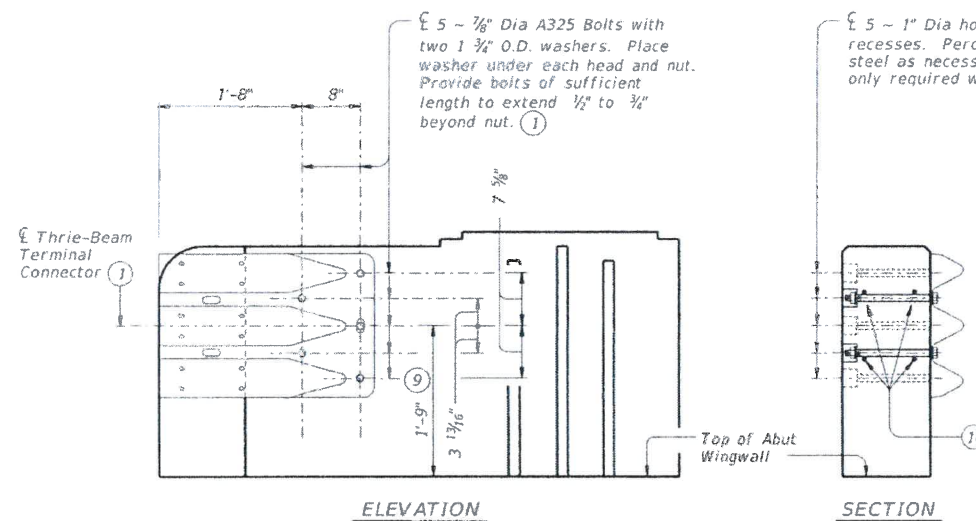
LEVELS DISPLAYED	PATH:	
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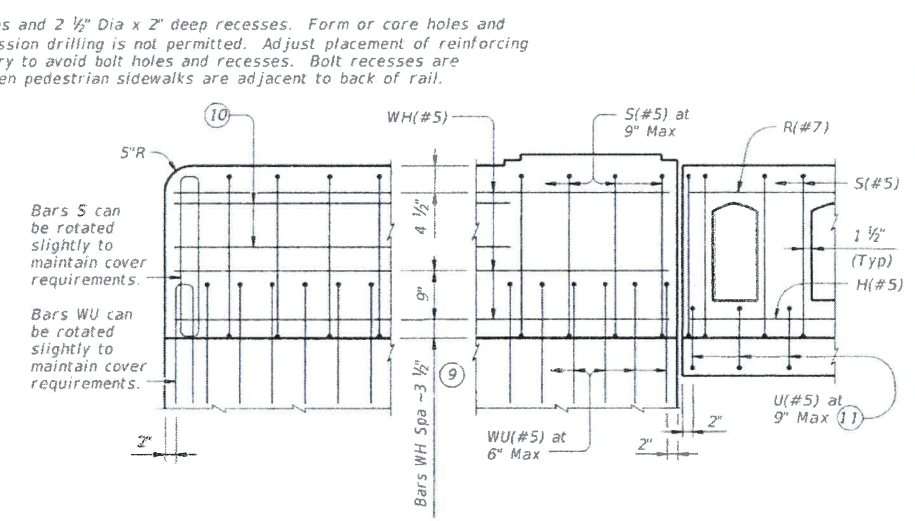
ROADWAY ELEVATION OF RAIL

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge unless otherwise shown in the plans.
- ② Number of windows in exterior bays are equal.
- ③ Number of windows in interior bay(s) are not less than the amount in exterior bays (Note 2).
- ④ Space Span Pilasters at 1/3 span length (Approx) when spans are 100 ft and less, as shown. Space Span Pilasters at 1/5 span length (Approx) for spans greater than 100 ft.
- ⑤ Dimension is the same for all posts adjacent to Span Pilasters in a span. Dimension may vary from span to span, Min = 3", Max = 7 1/2".
- ⑥ Min = 6", Max = 1'-3".
- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/2" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑧ Place Preformed Bituminous Fiber Material between slab and rail when rail extends over expansion joint. Shift Bars U as necessary.
- ⑨ Increase 2" for structures with overlay.
- ⑩ Place 4 additional Bars WH(#5) 3'-8" in length inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- ⑪ Shift U Bars from region below 1/2" Preformed Bituminous Fiber Material at joints.



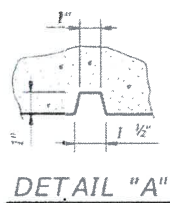
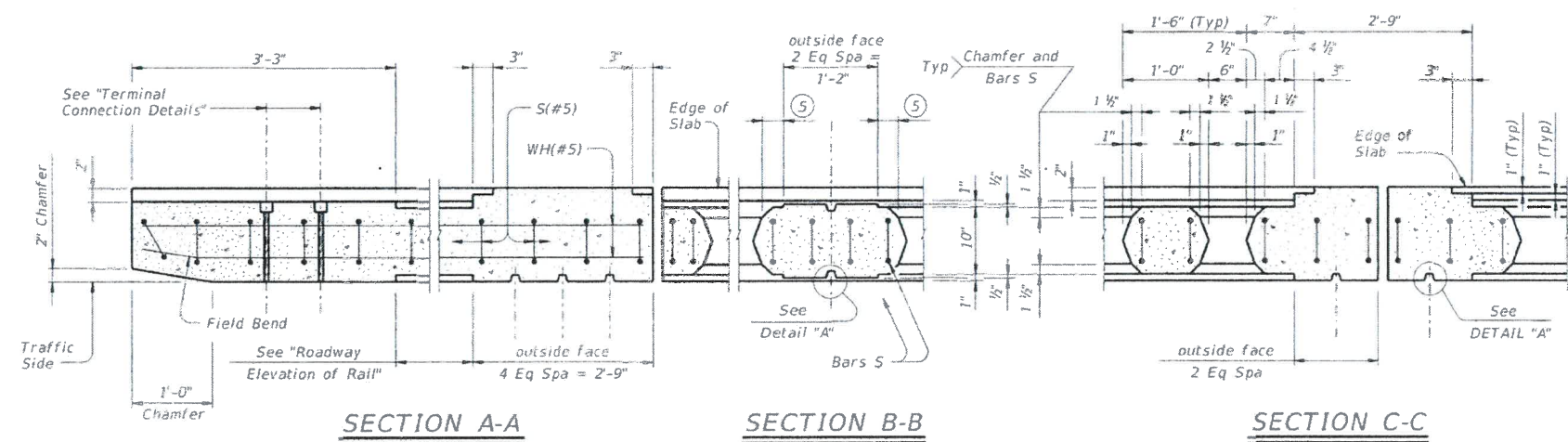
TERMINAL CONNECTION DETAILS

(Showing parapet with Pilaster on 6'-0" Wingwall)



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

The use of this railing is restricted to speeds of 45 mph or less.



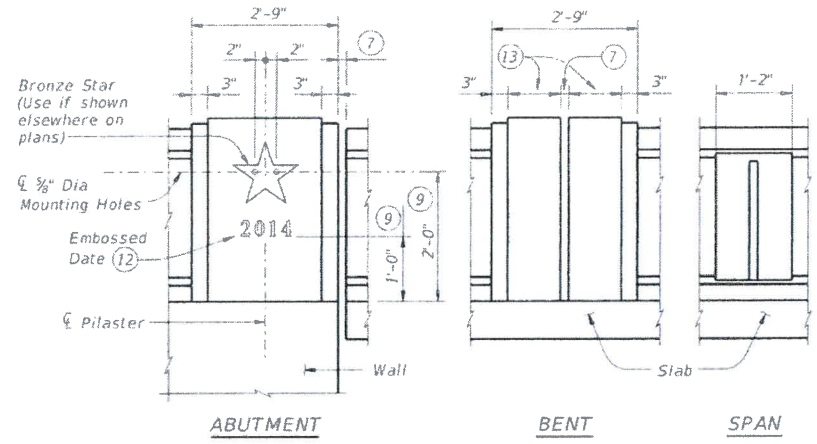
DETAIL "A"

SHEET 1 OF 2

Texas Department of Transportation		Bridge Division Standard	
TRAFFIC RAIL TEXAS CLASSIC			
TYPE T411			
FILE: r1std008.dgn	DN: TxDOT	CR: TxDOT	DN: TxDOT
CON: TxDOT	SECT:	JOB:	HIGHWAY:
REVISIONS			
DIST:	COUNTY:	SHEET NO:	

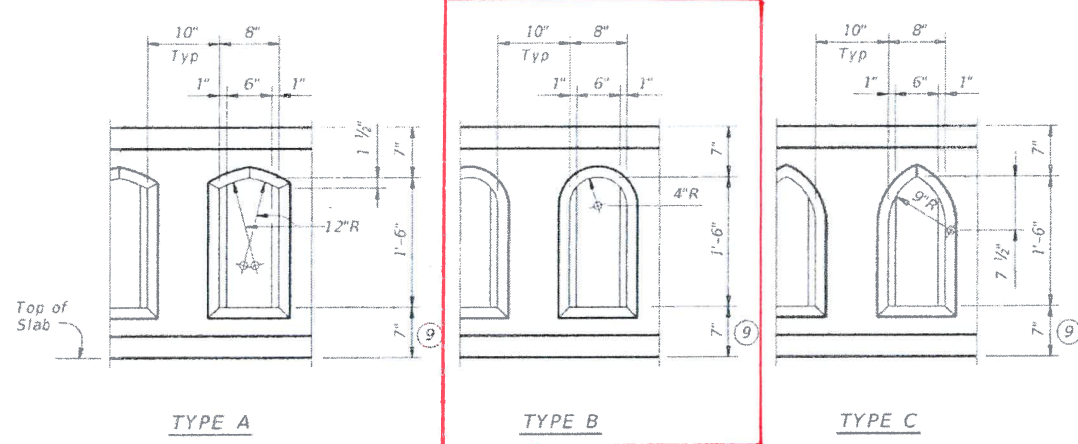
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FILE:

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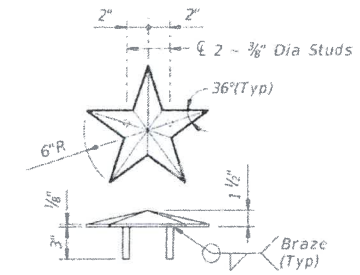


EXTERIOR PILASTER ELEVATIONS

- 7 Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/4" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- 9 Increase 2" for structures with overlay.
- 12 Construction year (use if shown elsewhere on plans) 3" High "Plantin Bold" Typeface with 1/4" recess. Placed at one Abutment only or as directed by the Engineer.
- 13 Dimensions must be the same on each side of joint.
- 14 Reduce by 2" or field bend over Preformed Bituminous Fiber Material to gain cover.
- 15 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- 16 As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- 17 Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- 18 Bronze Star dimensions of the final product can be slightly smaller due to shrinkage after casting.



WINDOW TYPES *TYPE B WINDOWS USED*



BRONZE STAR DETAIL

- Two known manufacturers are:
- Kassons Castings
Austin, Texas
 - Southwell Company
San Antonio, Texas

CONSTRUCTION NOTES:
 Attach Bronze Star with a Type III Class C epoxy. Clamp star until epoxy achieves set. Remove any visible epoxy "squeeze out" from under star.
 Face of rail and pilasters, parapet must be plumb unless otherwise approved.
 Apply a one rub finish to all railing surfaces unless otherwise shown elsewhere on the plans.

MATERIAL NOTES:
 Provide Class "C" concrete for railing. Provide Class "C" (HPC) concrete if shown elsewhere in the plans. Provide Grade 60 reinforcing steel.
 Provide bar laps, where required, as follows:

- Uncoated ~ #5 = 1'-9"
- Uncoated ~ #7 = 2'-9"
- Epoxy coated ~ #5 = 2'-7"
- Epoxy coated ~ #7 = 4'-1"

Epoxy coat all rail reinforcement if slab bars are epoxy coated.
 Bronze Star must be cast of architectural bronze having the following composition: Copper 85 %, Tin 5 %, Lead 5 %, Zinc 5 %.

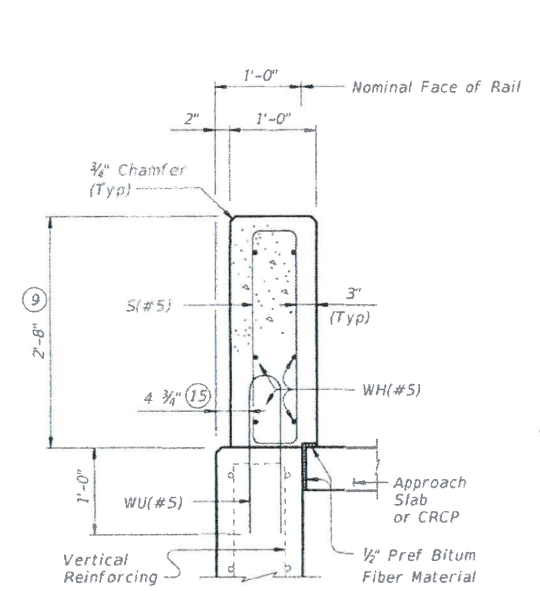
GENERAL NOTES:
 This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. This rail is only approved for low speed use, speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.
 Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
 Shop drawings will not be required for this rail.

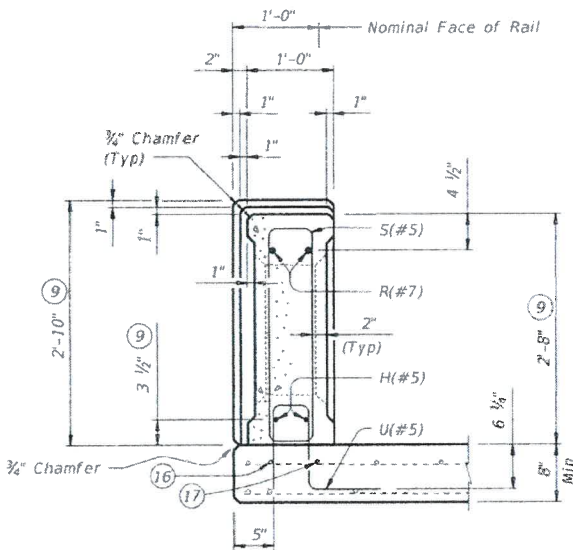
See Bridge Layout or other plan sheets for the following: dimensions with the number of span pilasters, dimensions with the number of windows, window type, inclusion of bronze stars, inclusion of construction year with abutment identity.

Submit erection drawings showing span number, span pilaster locations, number of windows between pilasters and spacing to first window (see Note 6) to the Engineer for approval.
 Average weight of railing with no overlay increase and no pilasters is 270 plf.

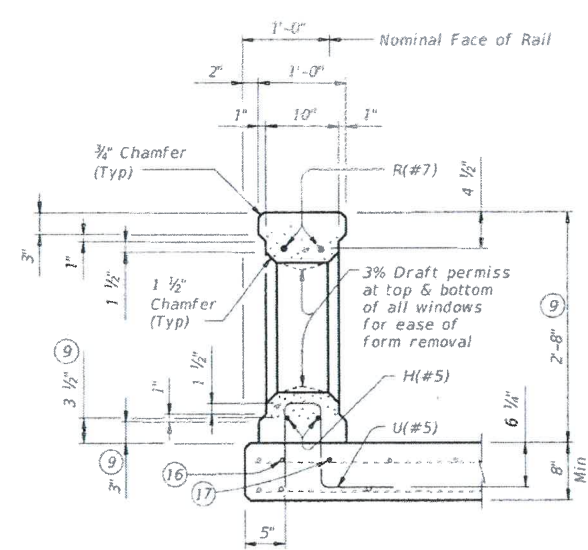
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.



SECTION THRU RAIL ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



SECTION THRU RAIL POST ON BRIDGE SLAB (Showing Pilaster)



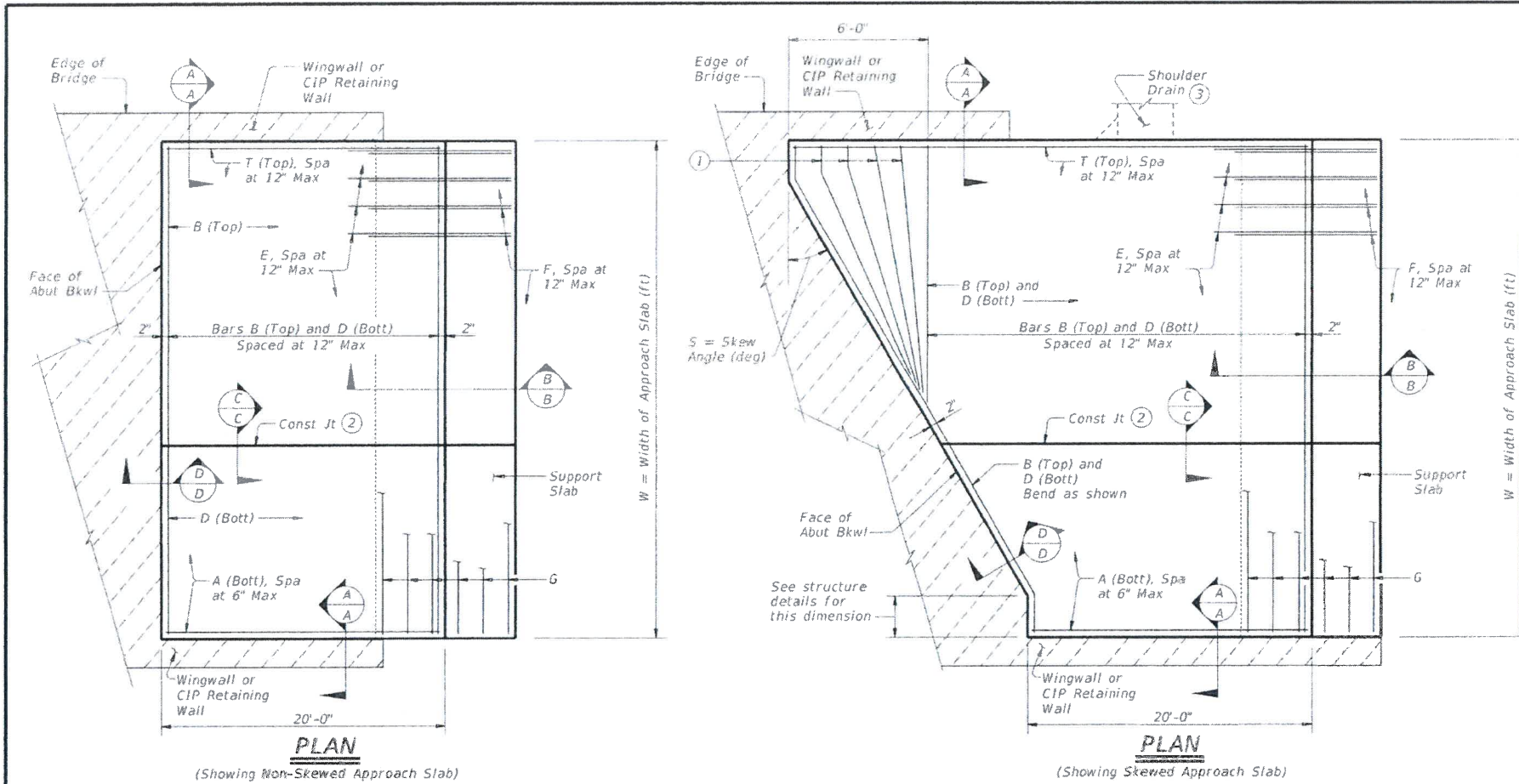
SECTION THRU RAIL WINDOW ON BRIDGE SLAB

SECTIONS THRU RAIL

		Bridge Division Standard	
TRAFFIC RAIL TEXAS CLASSIC			
TYPE T411			
FILE: v151d008.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT
©TxDOT July 2014	COMP	SECT	JOB
REVISIONS			HIGHWAY
	DIST	COUNTY	SHEET NO

DATE: FILE:

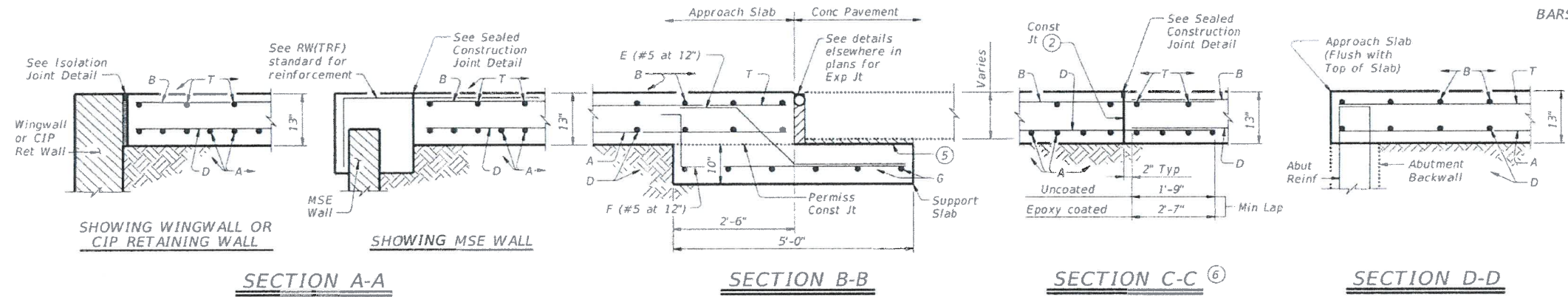
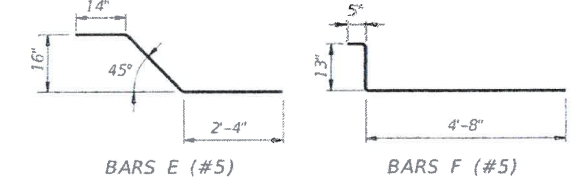
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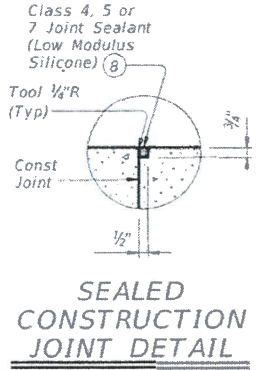
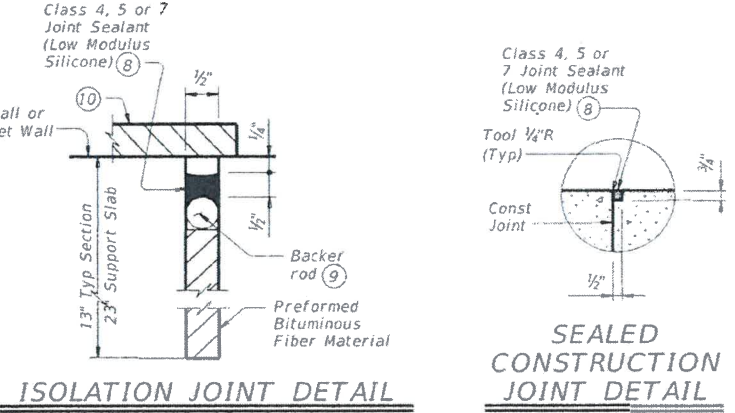
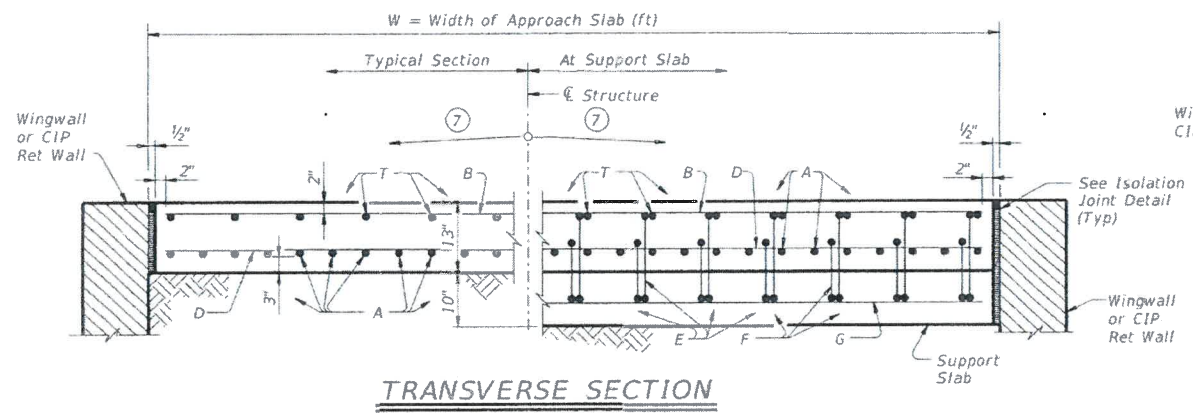
BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight = 8.5 Lbs/SF of Approach Slab = 18.4 Lbs/LF of Support Slab	
Vol of Appr Slab Conc (CY) = 1.052W - 0.093W x T + 0.02W ² Tan S (Includes Support Slab)	
W = Width of Approach Slab (ft)	
T = Conc Pavement Thickness (in)	
S = Skew Angle (deg)	

- Flare Bars B and D in this region (1'-6" Max Sp₀, 3" Min Sp₀). Minimum flared bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.
- See details elsewhere in plans for shoulder drain location and details.
- For Contractor's information only.
- On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.
- Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
- See details elsewhere in plans for required cross-slope.
- Place in accordance with Item 43B.
- Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant.
- Place 1/2" Preformed Bituminous Fiber Material between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.



GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
 Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
 Cure for 4 days using water or membrane curing per Item 422.
 Sealant, backer rod and preformed bituminous fiber material are subsidiary to approach slab concrete.
 Provide a 1" bondbreaker (asphaltic concrete pavement or asphalt stabilized base) between the approach slab and cement stabilized backfill or cement treated base. Other bondbreakers may be used if approved by the Engineer.

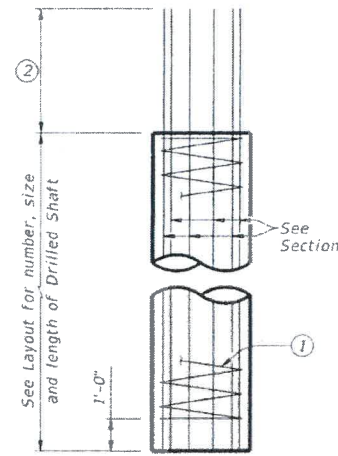


Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

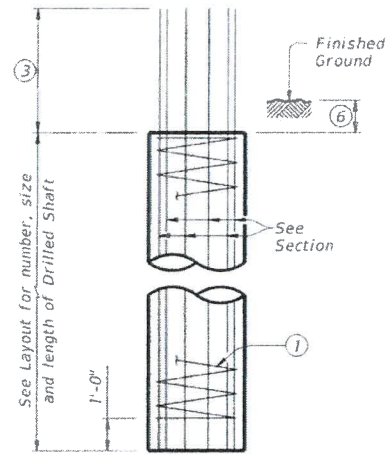
Texas Department of Transportation		Bridge Division Standard	
BRIDGE APPROACH SLAB CONCRETE PAVEMENT			
BAS-C			
FILE: basctel.dgn	DN: TxDOT	CK: TxDOT	DR: FxDOT
REV: TxDOT	DATE: January 2015	CONF: SECT	JOB: HIGHWAY
REVISIONS		DIST:	COUNTY:
		SHEET #2	

DATE:
FILE:

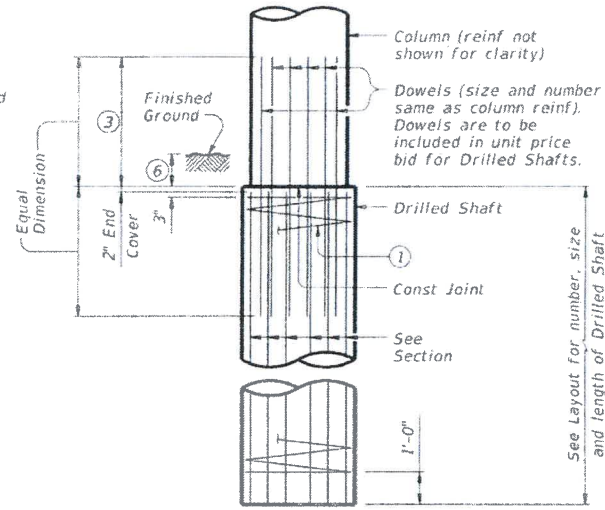
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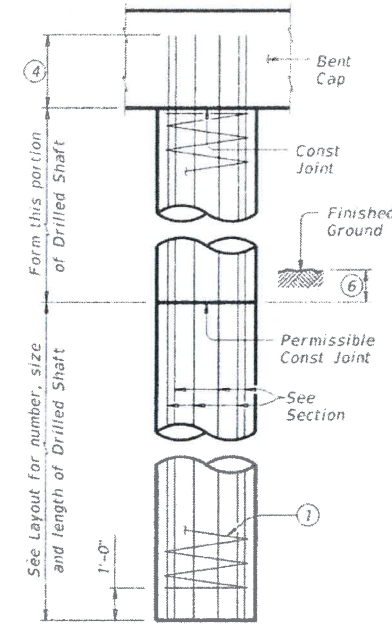
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



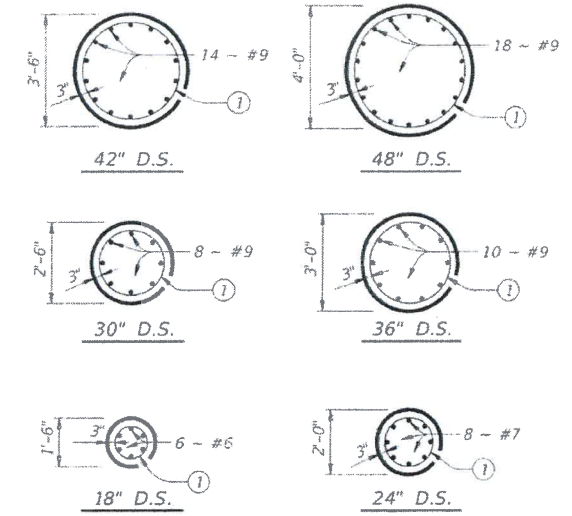
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL ⑤



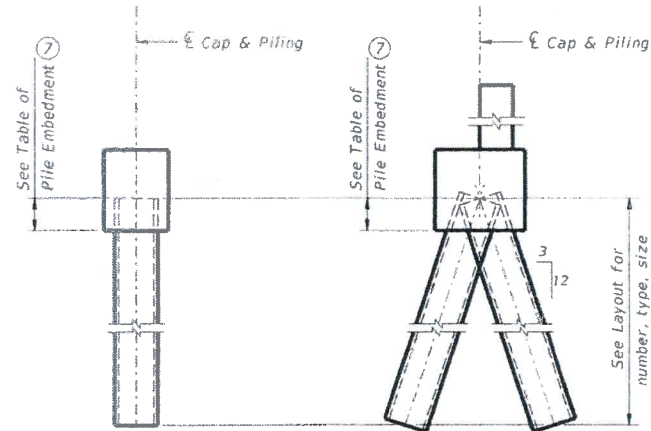
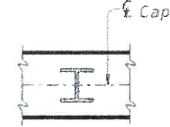
DRILLED SHAFT SECTIONS

DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

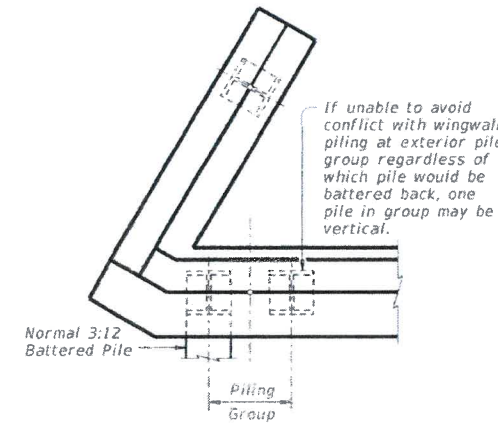
See standard CP for additional details on concrete pile embedment.

ORIENTATION OF STEEL H-PILING



VERTICAL PILE

BATTERED PILE



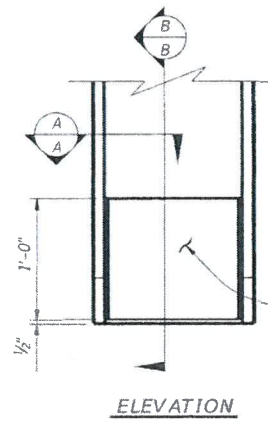
DETAIL "A"

(Showing Plan View of a 30° Skewed Abutment)

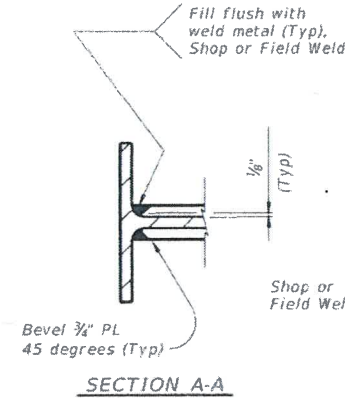
- ① #3 Spiral at 6" pitch (One and a half flat turns top & bottom).
- ② Min extension into supported element:
#6 Bars = 1'-6"
#7 Bars = 1'-8"
#9 Bars = 2'-3"
- ③ Min lap with Column reinf:
#7 Bars = 2'-9"
#9 Bars = 4'-6"
- ④ Min extension into supported element:
#6 Bars = 1'-6"
#7 Bars = 1'-8"
#9 Bars = 2'-8"
- ⑤ Drilled Shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the Drilled Shaft diameter equals the Column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- ⑥ 1'-0" Min
- ⑦ Or as shown on plans.

PILING DETAILS

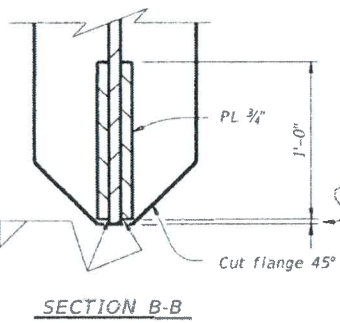
(Concrete or Steel H)



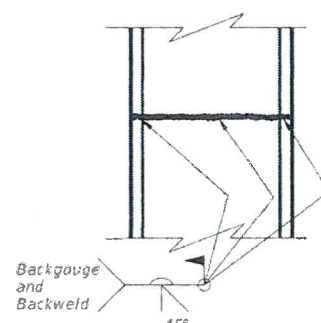
ELEVATION



SECTION A-A

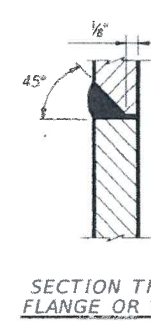


SECTION B-B



STEEL H-PILE SPLICE DETAIL

Use when required.



SECTION THRU FLANGE OR WEB

STEEL H-PILE TIP REINFORCEMENT

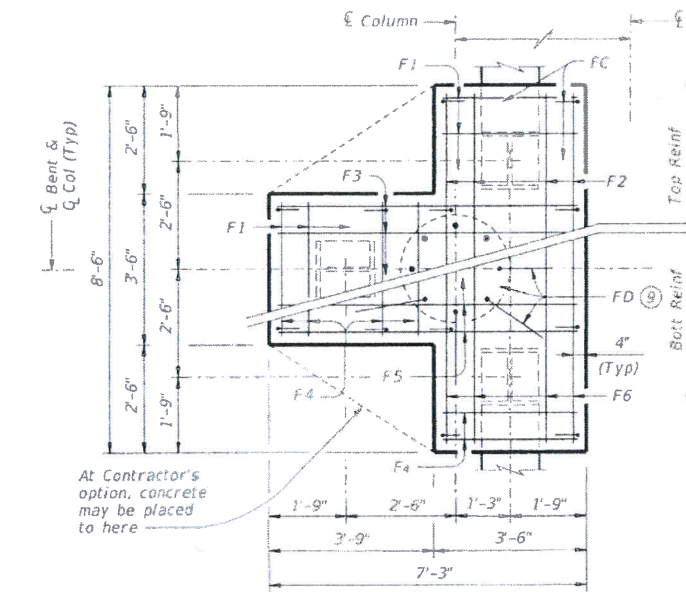
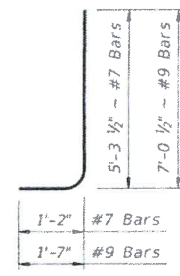
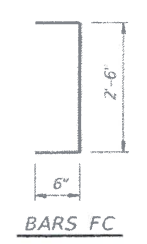
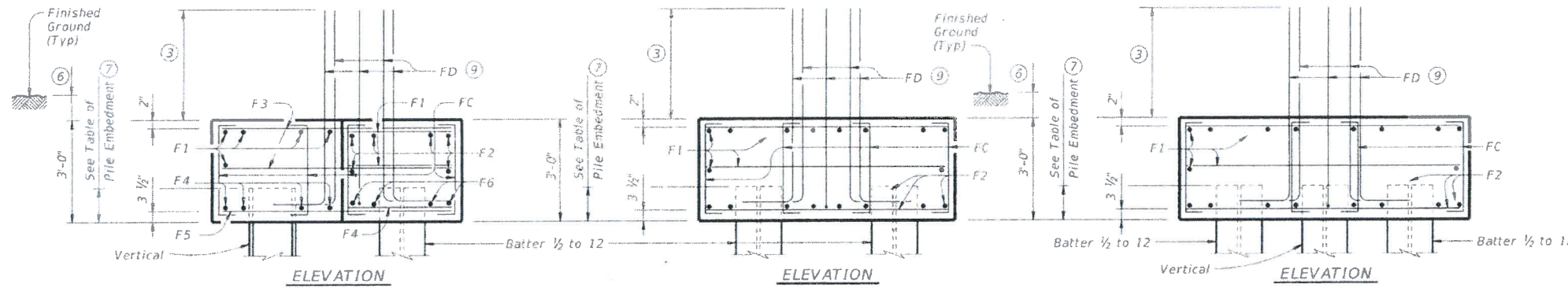
See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.

Texas Department of Transportation		Bridge Division Standard	
COMMON FOUNDATION DETAILS			
FD			
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©TxDOT January 2015	CONT: SECT	JOB: HIGHWAY	
REVISIONS:			
LIST	COUNTY		SHEET NO.

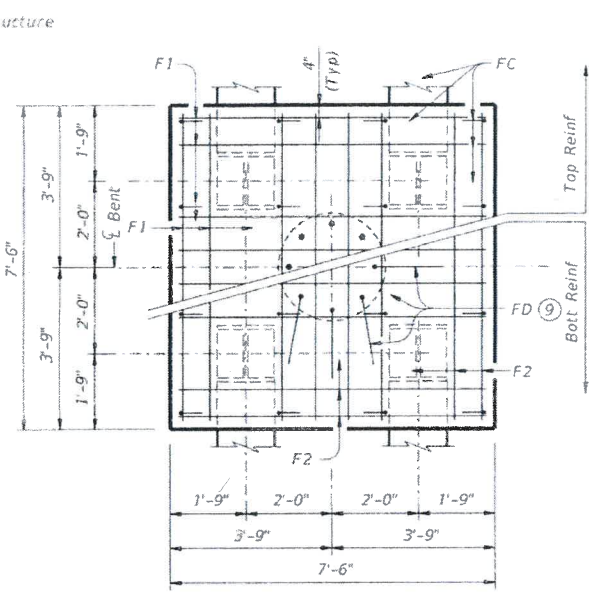
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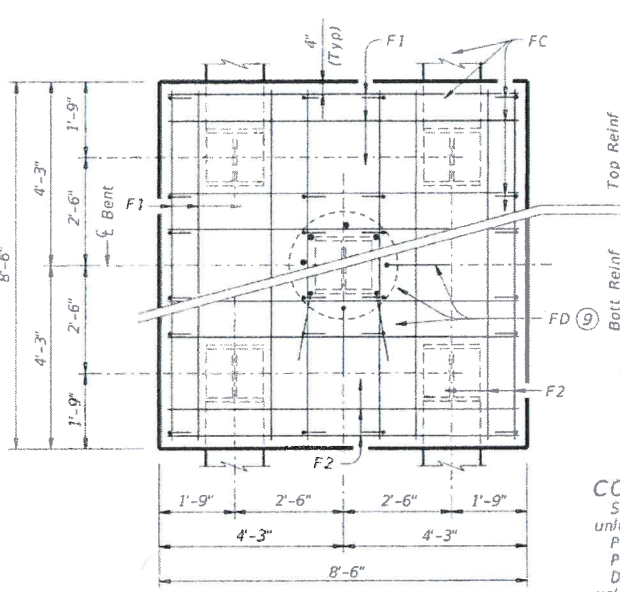
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THREE PILE FOOTING
For 36" Dia and smaller columns.



FOUR PILE FOOTING
For 42" Dia and smaller columns.



FIVE PILE FOOTING
For 42" Dia and smaller columns.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS				
ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'-2"	23
F2	6	#4	8'-2"	33
F3	6	#4	6'-11"	28
F4	8	#9	3'-2"	86
F5	4	#9	6'-11"	94
F6	4	#9	8'-2"	111
FC	12	#4	3'-6"	28
FD(10)	8	#9	8'-8"	236
Reinforcing Steel			Lb	639
Class "C" Concrete			CY	4.8
ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'-2"	96
F2	16	#8	7'-2"	306
FC	16	#4	3'-6"	37
FD(11)	8	#9	8'-8"	236
Reinforcing Steel			Lb	675
Class "C" Concrete			CY	6.3
ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'-2"	109
F2	16	#9	8'-2"	444
FC	24	#4	3'-6"	56
FD(11)	8	#9	8'-8"	236
Reinforcing Steel			Lb	845
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:
See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
Provide Class C Concrete (f'c = 3600 psi), unless shown otherwise.
Provide Grade 60 reinforcing steel.
Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.

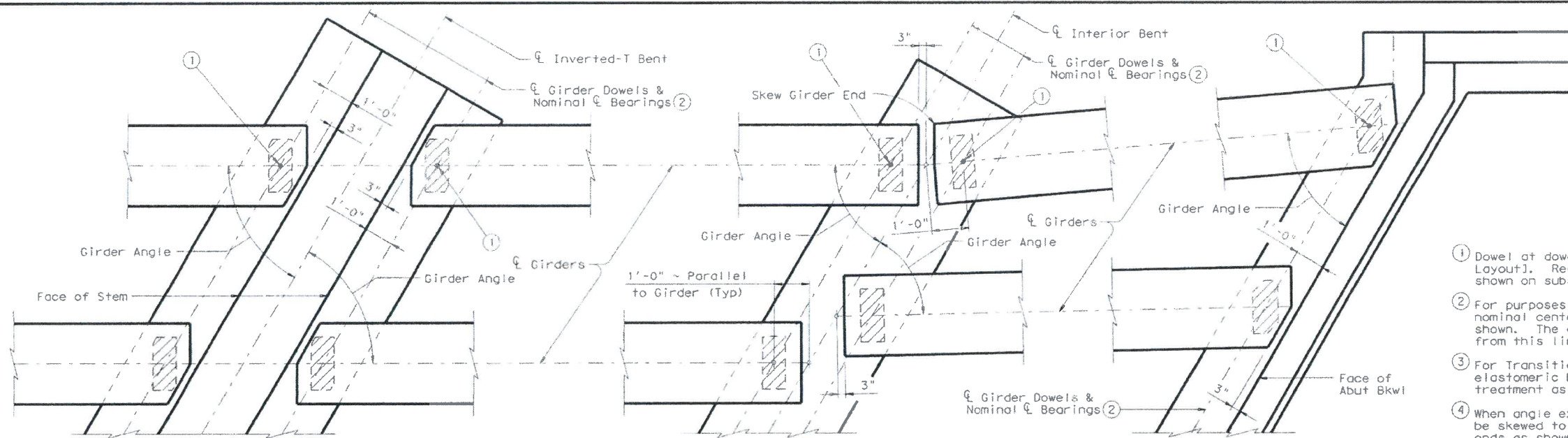
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:
Do not use the Drilled Shaft details shown on this standard for retaining wall, noise wall, barrier or sign foundations without structural evaluation.
Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
Maximum allowable pile loads for the footings shown are:
72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

- ③ Min lap with Column reinf:
#7 Bars = 2'-9"
#9 Bars = 4'-6"
- ⑥ 1'-0" Min
- ⑦ Or as shown on plans.
- ⑧ See Layout for Type, Size and length of Piling.
- ⑨ Number and size of FD bars must match Column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs.
For 36" Columns, add 2 FD bars (59 lbs).
- ⑪ For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs.
For 36" Columns, add 2 FD bars (59 lbs).
For 42" Columns, add 6 FD bars (177 lbs)
(42" Columns disallowed on 3 Pile Footings)

		Bridge Division Standard	
COMMON FOUNDATION DETAILS			
FD			
FILE: 10510e01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT January 2015	CONT	SECT	JOB
REVISIONS		DISY	COUNTY
		SHEET NO.	

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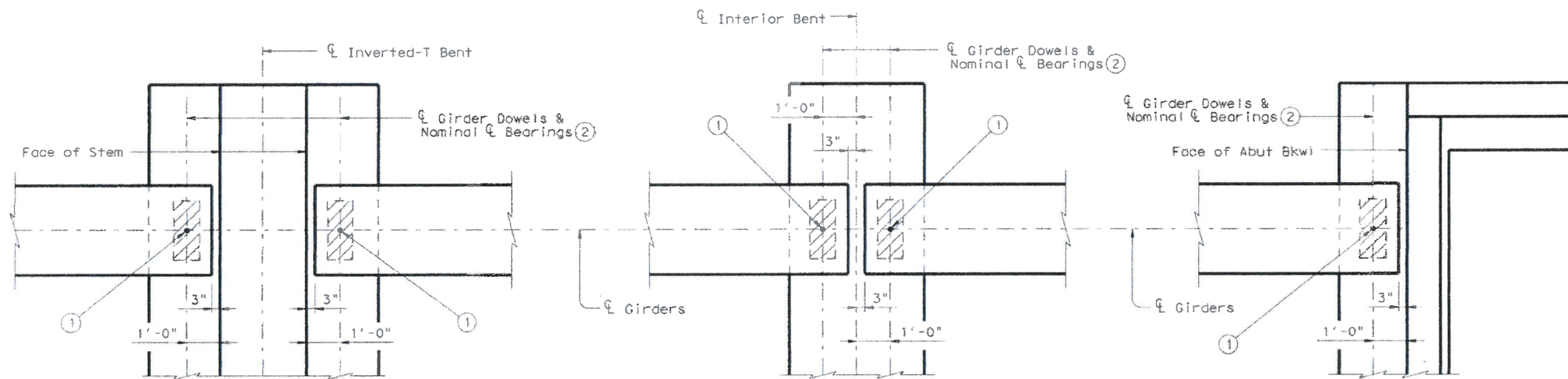


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW ③

- ① Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- ② For purposes of computing Bearing Seat Elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For Transition Bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for Abutments.
- ④ When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.
- ⑤ See Elastomeric Bearing Data Table for Bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



AT INVERTED-T BENT

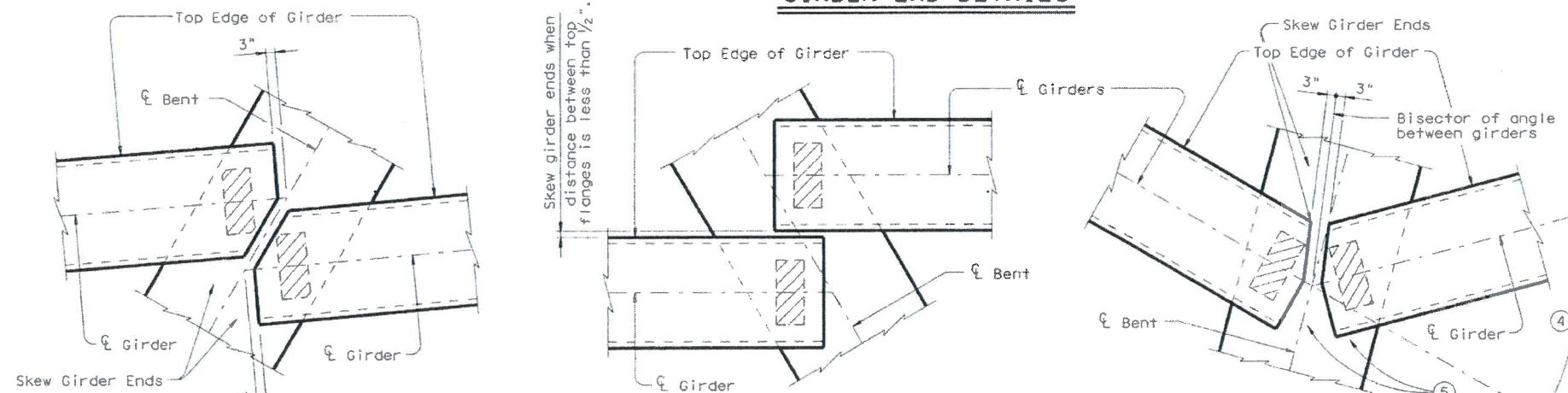
AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT ③

GENERAL NOTES:

These details accommodate skew angles up to 60°. Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer. Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

GIRDER END DETAILS



GIRDER CONFLICT DETAILS

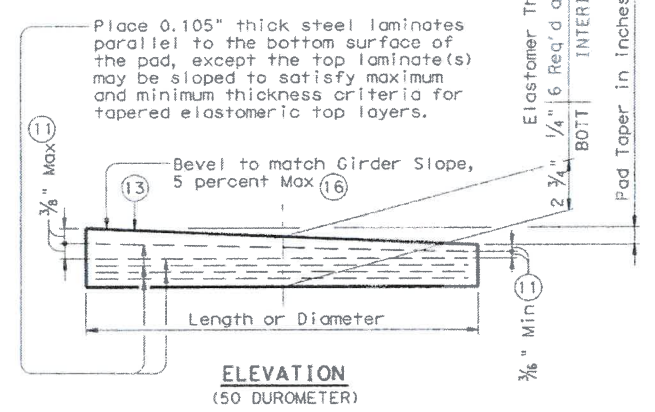
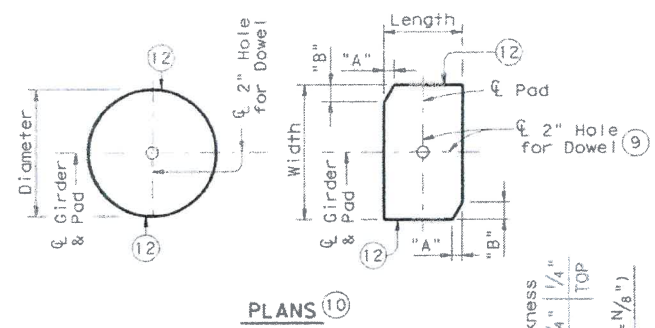
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**ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS**

IGEB

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REVISIONS				
12/10: Add 90° Sole Plate Detail.	COUNTY	CONTROL SECT	JOB	HIGHWAY

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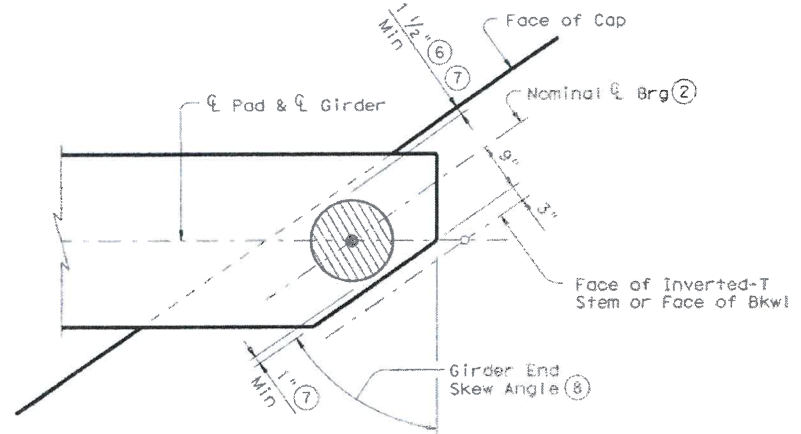
LAMINATED ELASTOMERIC BEARING DETAILS 14

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS 15

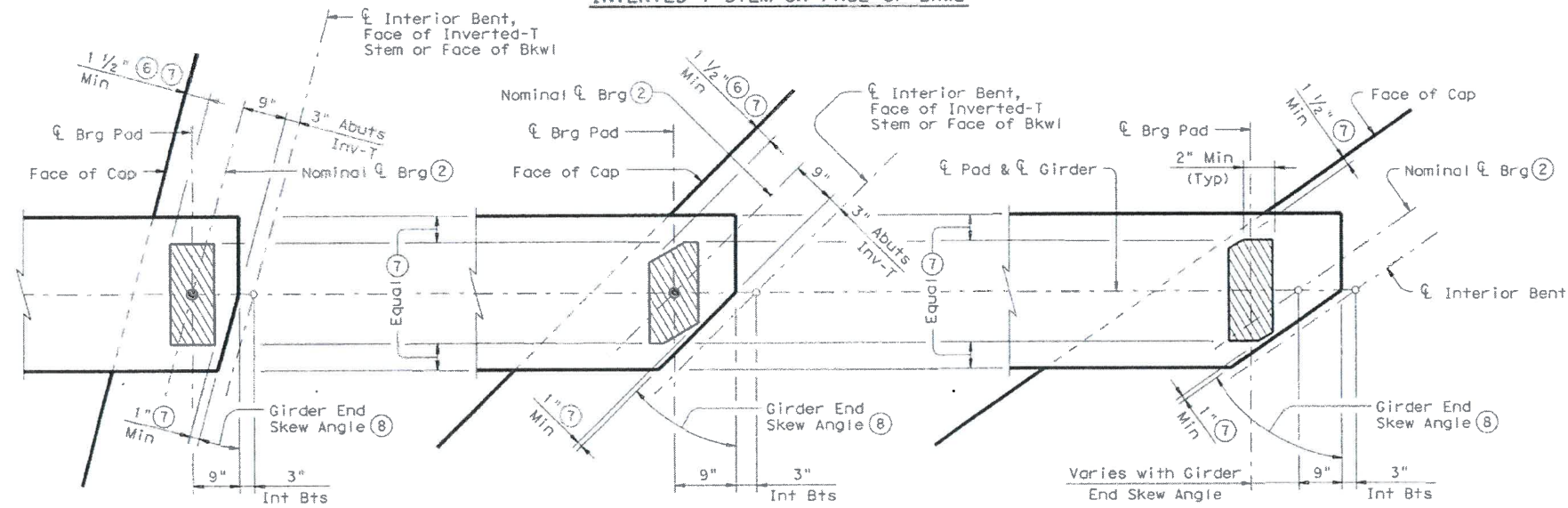
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 1/2"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 1/2"

ELASTOMERIC BEARING DATA TABLE

Bent Type	Girder Type	Bearing Type 13	Girder End Skew Angle Range	Pad Size Lgth x Wath	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21° thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-3-"N"	30° thru 45°	9" x 21"	4 1/2"	4 1/2"
		G-4-"N"	45° thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21° thru 30°	9" x 21"	1 1/2"	2 1/2"
		G-7-"N"	30° thru 45°	10" x 21"	4 1/2"	4 1/2"
		G-8-"N"	45° thru 60°	10" x 21"	7 1/4"	4 1/4"
CONVENTIONAL INTERIOR BENTS	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 60°	8" x 21"	---	---
		G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) 17	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18° thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-9-"N"	30° thru 45°	8" x 21"	3"	3"
		G-10-"N"	45° thru 60°	9" x 21"	6"	3 1/2"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18° thru 30°	9" x 21"	---	---
		G-11-"N"	30° thru 45°	9" x 21"	1 1/2"	1 1/2"
G-12-"N"	45° thru 60°	9" x 21"	3"	1 3/4"		



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (No Girder Dowels) 17

ELASTOMERIC BEARING PLACEMENT DIAGRAMS

- 2 For purposes of computing Bearing Seat Elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- 3 for Inverted-T.
- 7 Factors controlling laminated bearing placement if no dowel is present. Place Centerline Pad as near Nominal Centerline Brg as possible between limits shown.
- 8 Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- 9 Provide 2" Dia Hole only at locations required. See substructure details for location.
- 10 See Elastomeric Bearing Data Table for dimensions.
- 11 Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- 12 Locate Permanent Mark here.
- 13 BEARING TYPE must be indicated on all pads. For tapered pads, BEARING TYPE must be located on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark. Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than (0.0625 / (Length or Dia)) IN/IN.
- 14 The use of Polyisoprene (natural rubber), for the manufacture of bearing pads, is not permitted.
- 15 Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- 16 See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- 17 If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

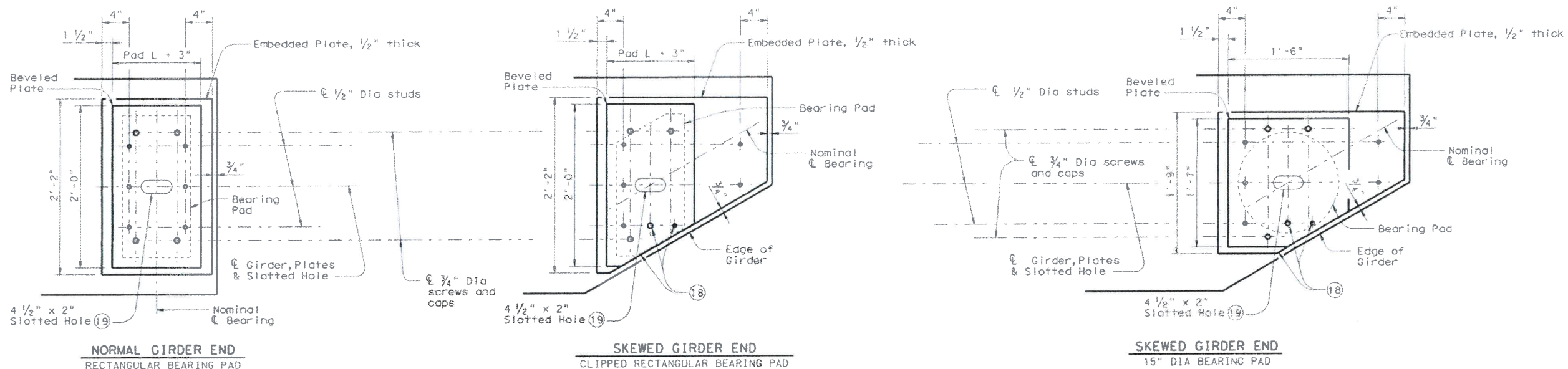
Texas Department of Transportation
Bridge Division

ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

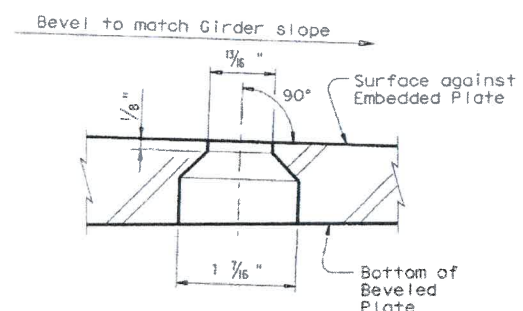
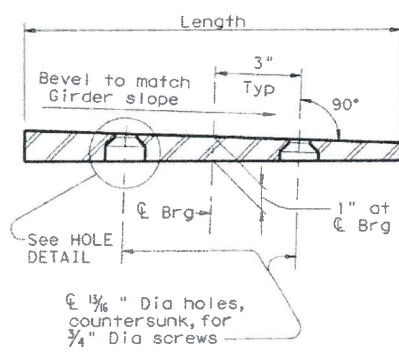
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REVISIONS				
12/10: Added Sole Plate Details.	COUNTY	CONTROL SECT	JOB	HIGHWAY

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PLAN VIEW OF SOLE PLATE DETAILS



- (18) Cut Beveled and Embedded Plates to match girder end skew. Adjust location of screw and stud as shown when necessary.
- (19) Slotted hole is required at doveled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16" +/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

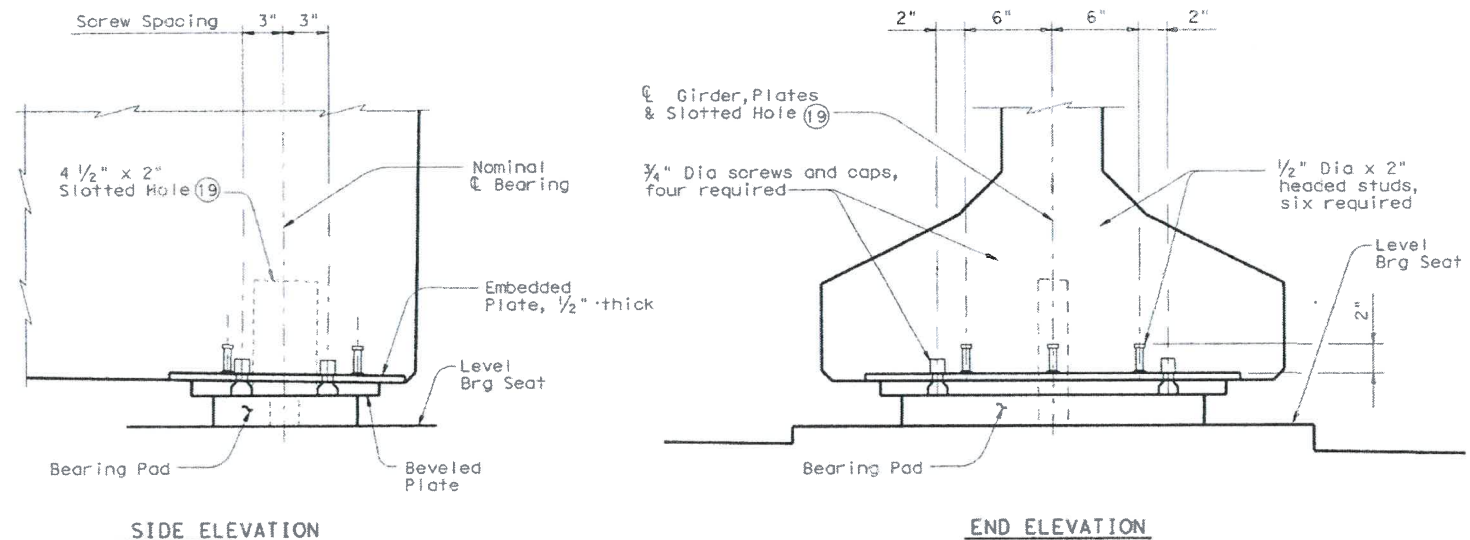
Steel plate must conform to ASTM A 36, A 572 Gr 50, or A 709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

3/4" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F 835. Electroplating must conform to ASTM B 633, SC 2, Type 1. Provide screws long enough to maintain a 3/4" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.



GIRDER DETAILS

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation
Bridge Division

**ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS**

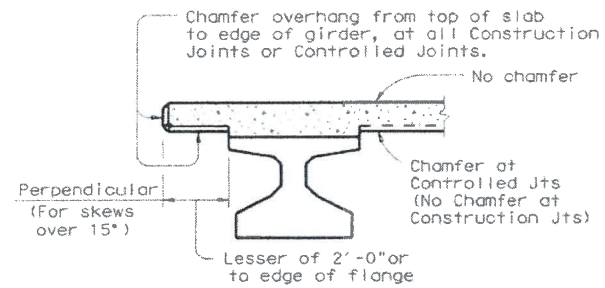
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REVISIONS				
12/10: Added Sole Plate Details.	COUNTY	CONTROL SECT	JOB	HIGHWAY

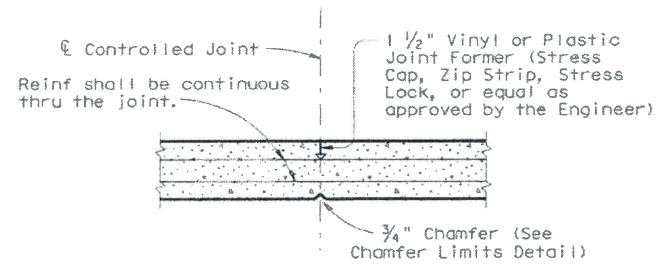
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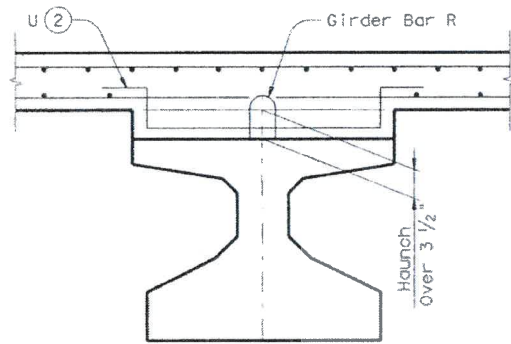
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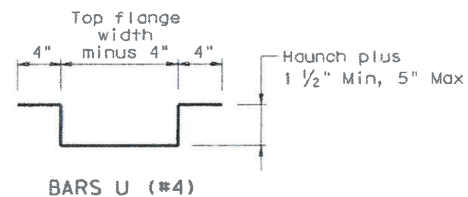
CHAMFER LIMITS DETAIL 1



CONTROLLED JOINT DETAIL
(Saw-cutting will not be allowed)



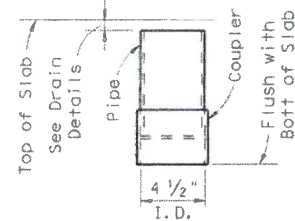
HAUNCH REINFORCING DETAIL



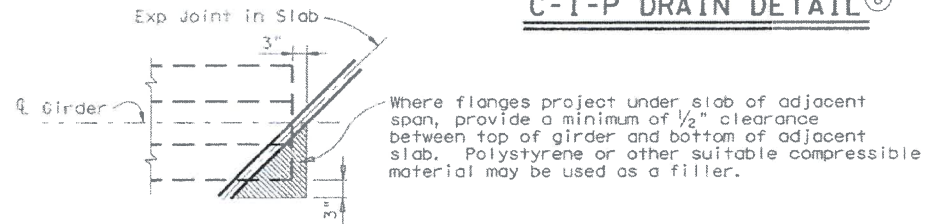
BARS U (#4)



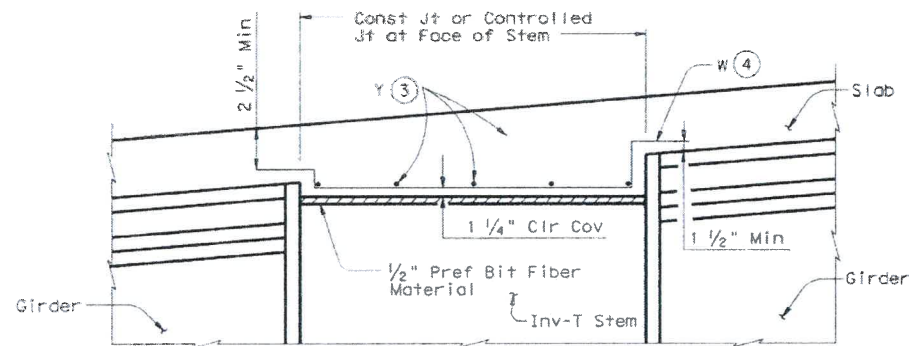
DRIP BEAD DETAIL



C-I-P DRAIN DETAIL 8

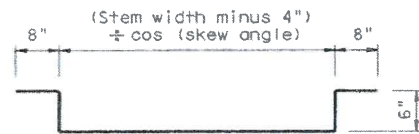


TREATMENT AT GIRDER END FOR SKEWED SPANS

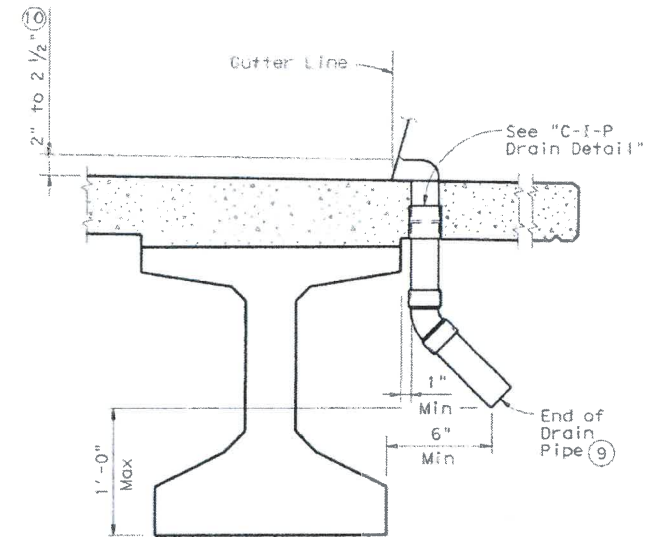


REINFORCEMENT OVER INV-T BENTS

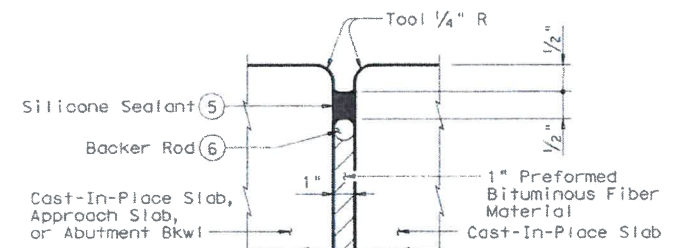
Slab reinforcement not shown for clarity.



BARS W (#4)



DRAIN DETAIL 10



TYPE A JOINT DETAIL 7


GENERAL NOTES:
Designed in accordance with AASHTO LRFD Specifications.
All items (reinforcing steel, drains, joint formers, etc.) shown on this sheet shall be considered subsidiary to other bid items.

DECK FORMWORK NOTES:
Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

- 1 See Span details for type of joint and joint locations.
- 2 Space Bars U with Girder Bars R in all areas where measured haunch exceeds 3 1/2".
- 3 Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- 4 Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.
- 5 Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- 6 1/4" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

- 7 The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints. Type A joints will not be paid for directly, but shall be considered subsidiary to Item 420, "Concrete Structures".
- 8 Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- 9 No water shall be discharged onto girders.
- 10 Drain Entrance formed in Rail or Sidewalk.
- 11 All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "PVC Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location shall be as directed by the Engineer. No drains shall be permitted over roadways or railways, or within 10'-0" of Bent Caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, shall be installed with the approval and direction of the Engineer.

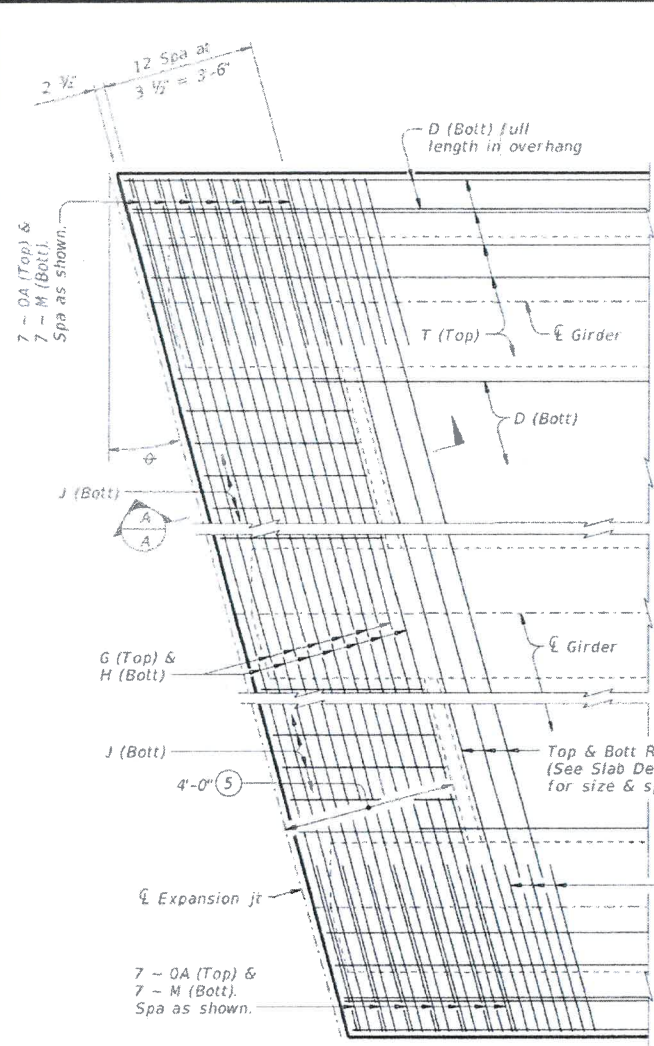
LEVELS DISPLAYED	ACC:
1	


Texas Department of Transportation
 Bridge Division
MISCELLANEOUS
SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

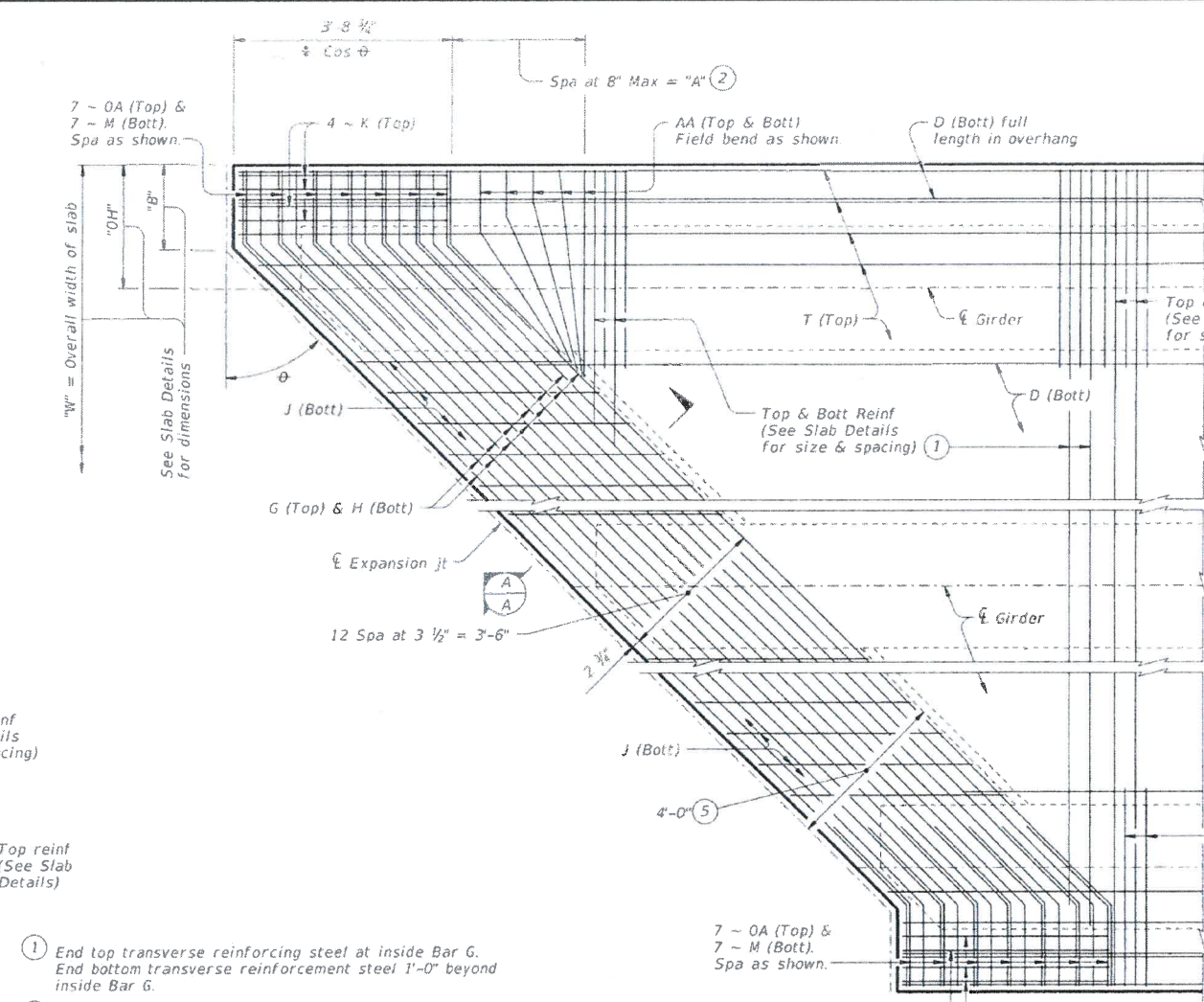
IGMS

FILE: igmsstet.dgn	DN: TxDOT	CK: TxDOT	DR: JTR	CR: TxDOT
© TxDOT June 2007	DISTRICT	FEDERAL AID PROJECT	SHEET	
REVISIONS				
02/09 Deck Formwork Notes	COUNTY	CONTROL SECT	JOB	HIGHWAY

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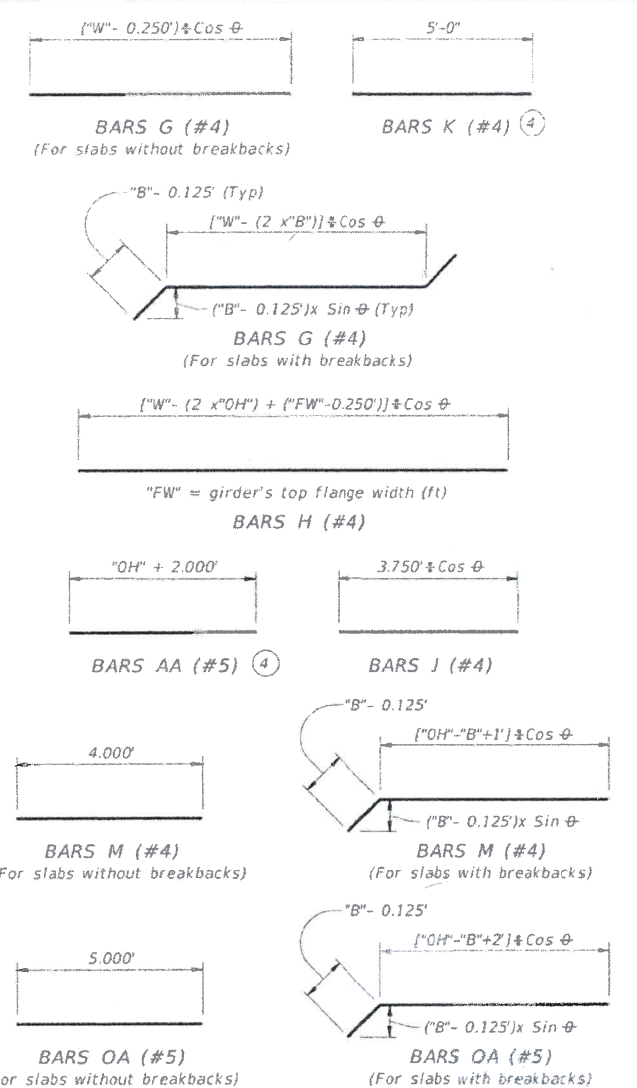


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

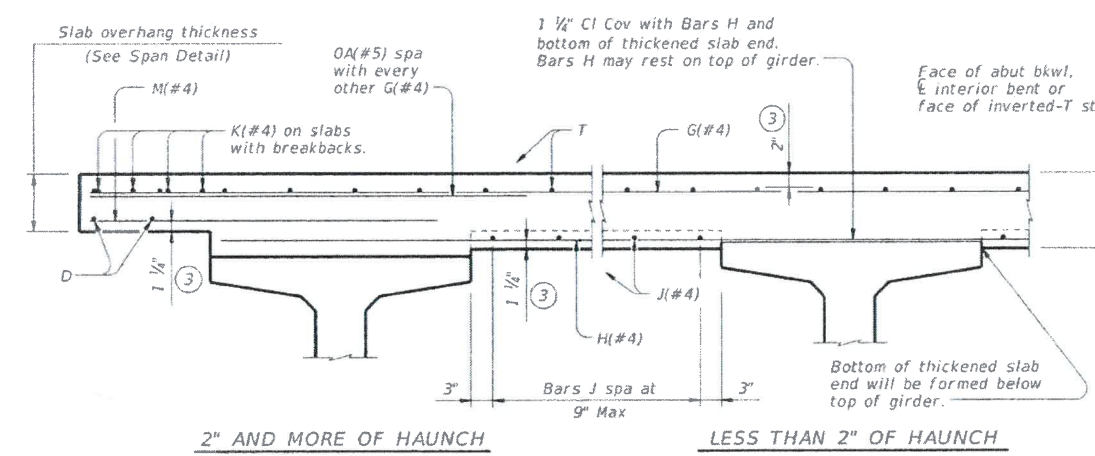
- ① End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
- ② $A = (OH + 2.333' - B) \times \tan \phi$
- ③ Provide clear cover as indicated unless otherwise shown on Span Details.
- ④ Only required on slabs with breakbacks.
- ⑤ Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



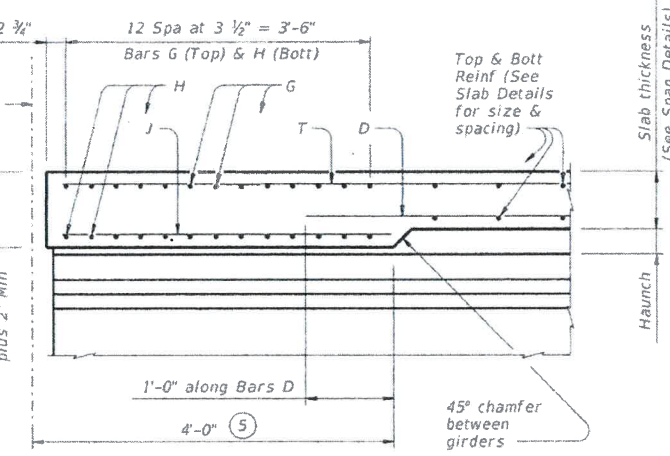
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. These details are restricted to Prestressed Concrete I-Girder Spans. These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used). When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel. If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated. Provide bar laps, where required, as follows:
 Uncoated - #4 = 1'-5"
 Epoxy Coated - #4 = 2'-1"

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



TYPICAL TRANSVERSE SECTION
 (Showing Prestressed Conc I-Girders at Brg)



SECTION A-A
 (Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

**THICKENED SLAB END DETAILS
 PRESTRESSED CONCRETE I-GIRDER SPANS**

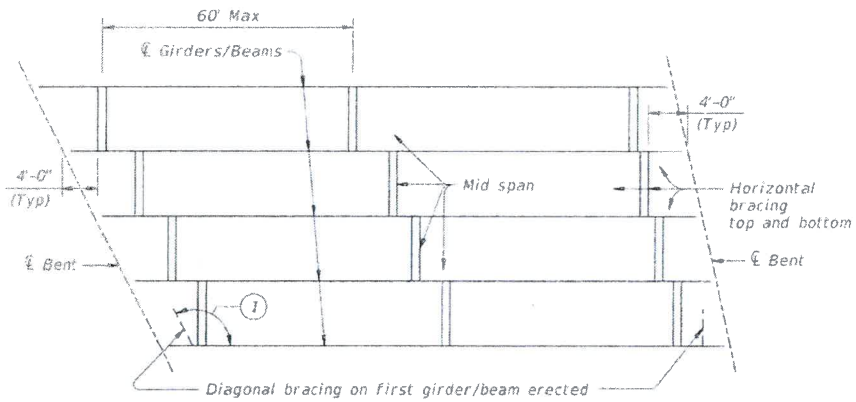
IGTS

FILE: igtsts1.dgn	DN: TxDOT	CR: TxDOT	OW: JTR	CK: TxDOT
©TxDOT October 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO	

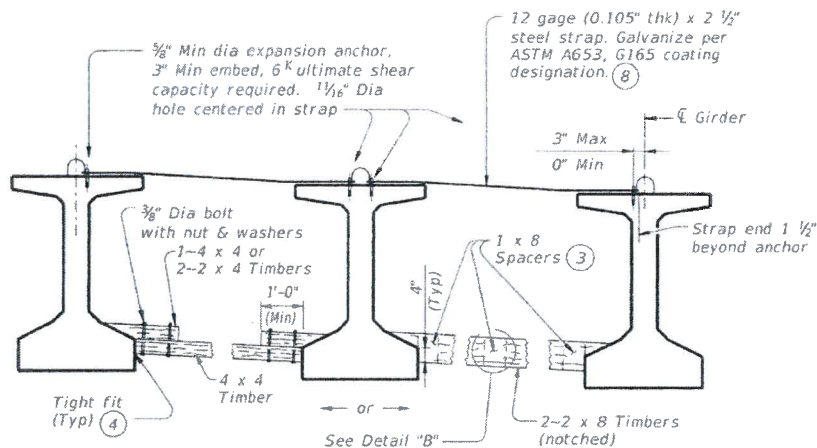
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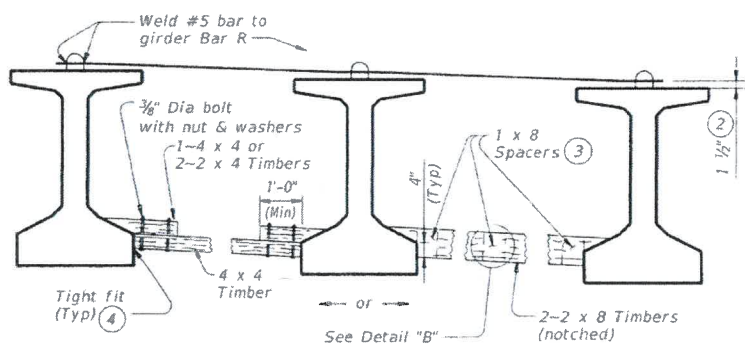


ERECTION BRACING



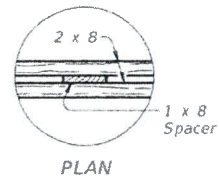
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)

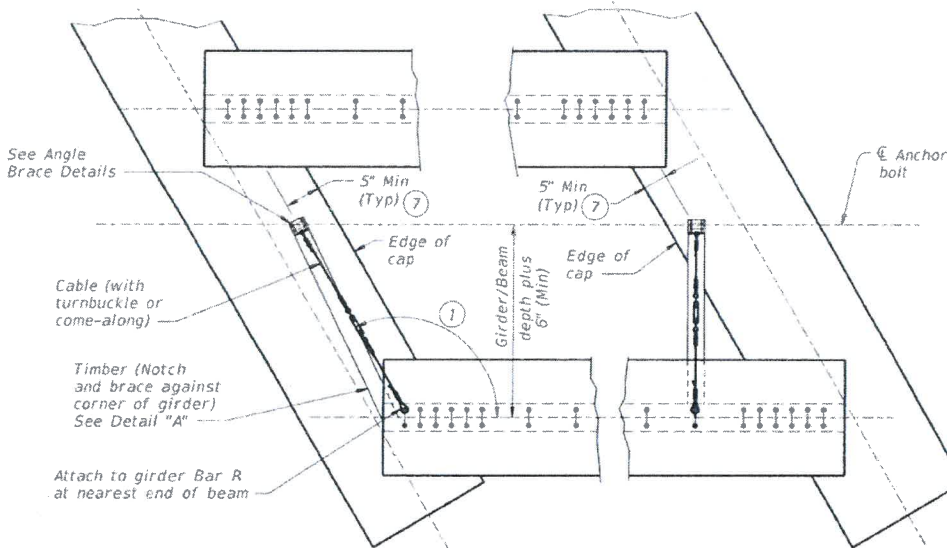


FOR ERECTION BRACING, OPTION 2

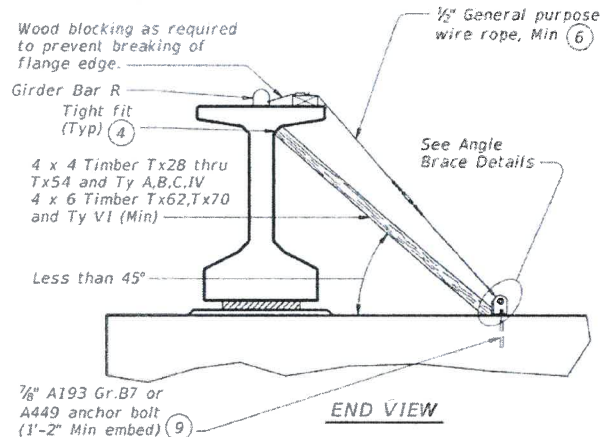
HORIZONTAL BRACING DETAILS



DETAIL "B"



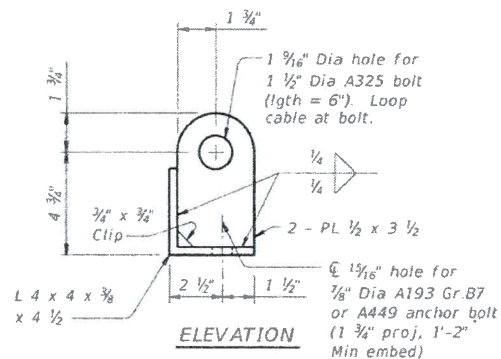
PLAN



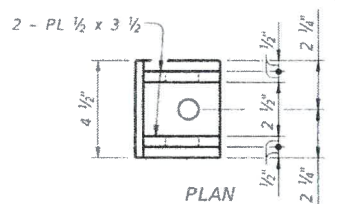
END VIEW

DIAGONAL BRACING DETAILS

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

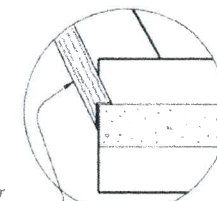
The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425. Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

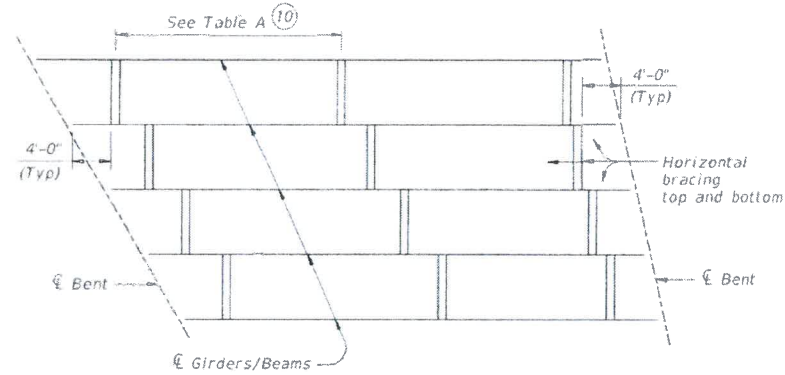
- 1 If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- 2 Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- 3 Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 6 All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing against the dead end.
- 7 It is acceptable to tie anchor bolts to cap reinforcement.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- 9 Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2

		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebrsts1.dwg	DN: TxDOT	CK: TxDOT	DW: TxDOT
DATE: October 2015	CONT: SECT	JOB: HIGHWAY	
REVISIONS		DIST	COUNTY
			SHEET NO.

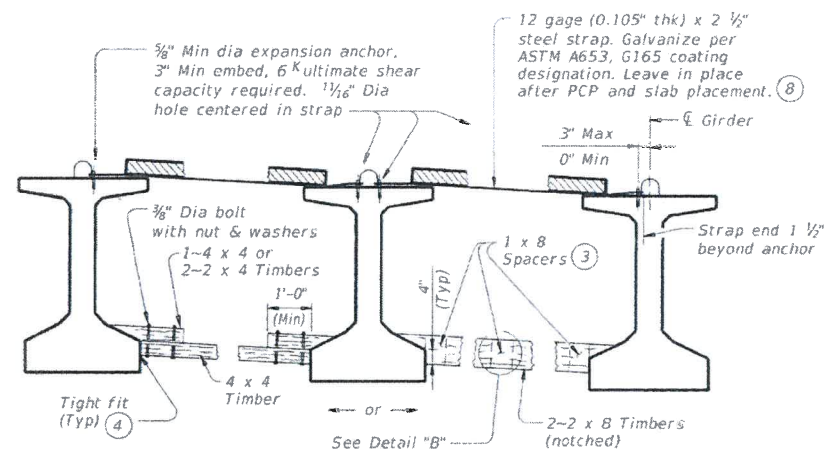
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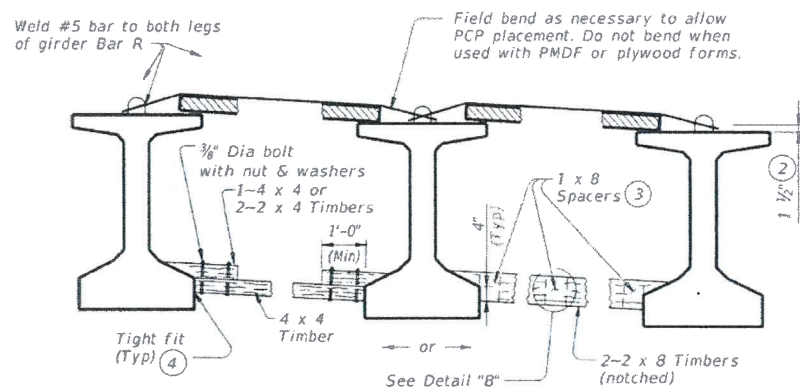
SLAB PLACEMENT BRACING

OPTION 1-RIGID BRACING (STEEL STRAP)			OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)		
Girder or Beam Type	Maximum Bracing Spacing		Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (1)	Slab Overhang 4'-0" and greater (1)		Slab Overhang less than 4'-0" (1)	Slab Overhang 4'-0" and greater (1)
Tx28	1/4 points	1/4 points	Tx28	1/4 points	1/6 points
Tx34	1/4 points	1/4 points	Tx34	1/4 points	1/6 points
Tx40	1/4 points	1/6 points	Tx40	1/4 points	1/6 points
Tx46	1/4 points	1/6 points	Tx46	1/4 points	1/6 points
Tx54	1/4 points	1/6 points	Tx54	1/4 points	1/6 points
Tx62	1/4 points	1/6 points	Tx62	1/4 points	1/6 points
Tx70	1/4 points	1/6 points	Tx70	1/4 points	1/6 points
A	1/6 points	1/6 points	A	2.0 ft	1.5 ft
B	1/6 points	1/6 points	B	3.0 ft	2.0 ft
C	1/6 points	1/6 points	C	4.5 ft	2.0 ft
IV	1/4 points	1/6 points	IV	1/4 points	4.0 ft
VI	1/4 points	1/6 points	VI	1/4 points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

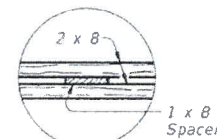
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



**PLAN
DETAIL "B"**

- Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.
- Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- Pressure treated landscape timbers can not be used.
- Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange lips.
- Bracing spacing (1/4 and 1/6 points) measured between first and last typical brace location.
- Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

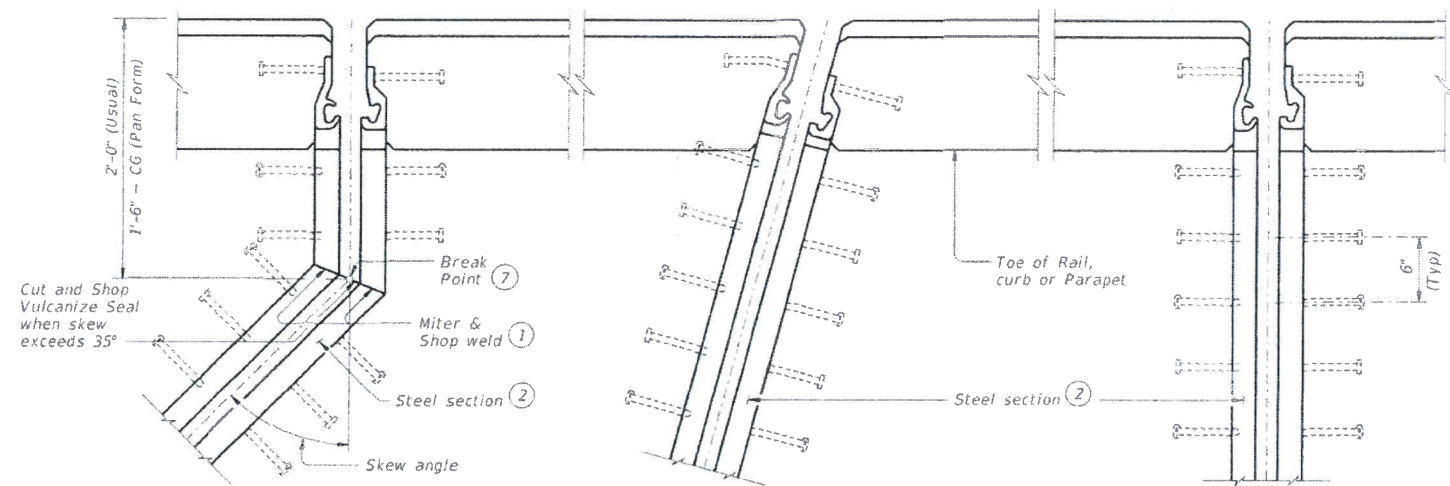
GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure. Removal of bracing for short periods of time to align girders and beams is permissible. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown. Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebrstsl.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT October 2015	CONT SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO

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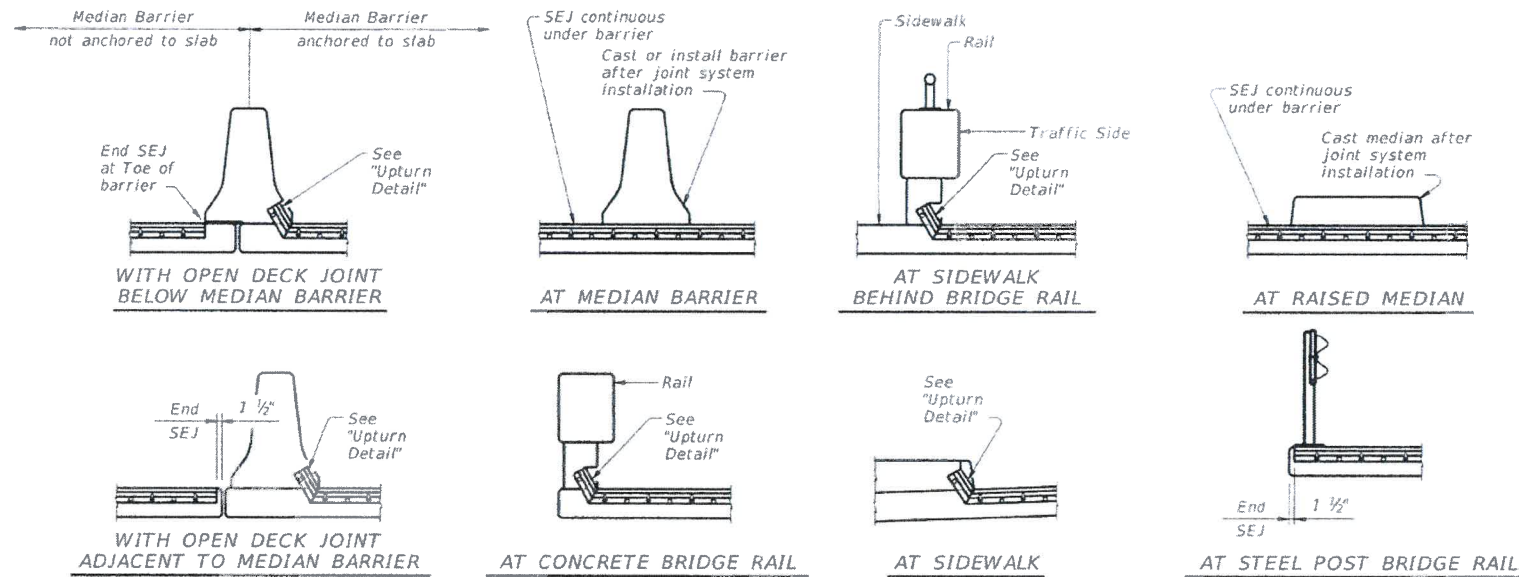
SHOWING SKEWS WITH SLAB BREAKBACKS

SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

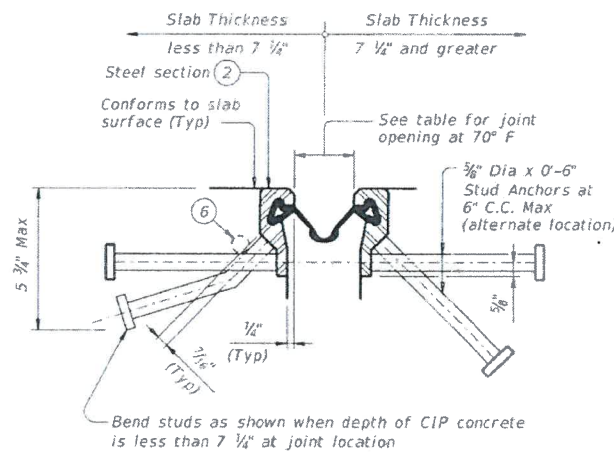
PLANS OF END CONDITIONS

Used for Watson Bowman Acme and D.S. Brown joint systems. Shown with Upturns

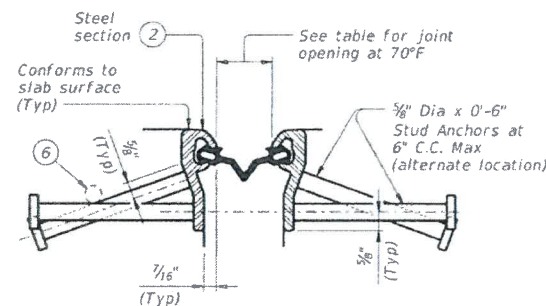


TYPICAL SECTIONS ⑤

Used for Watson Bowman Acme and D.S. Brown joint systems



SECTION THRU WATSON BOWMAN ACME JOINT



SECTION THRU D.S. BROWN JOINT

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening ③	Seal Type	Joint Opening ③
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"
R.J. Watson	As Shown	SF-400	2 1/2"	N/A	N/A

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations. For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

FABRICATION NOTES:

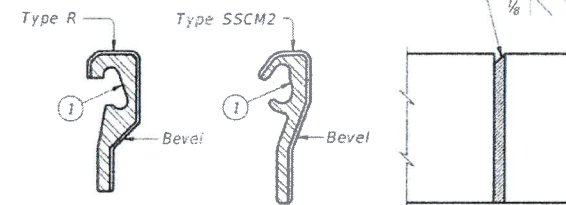
Temporarily shop assemble corresponding sections of Sealed Expansion Joints, check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts. The seal must be continuous and included in the price bid for Sealed Expansion Joint. Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2' Min and 4' Max. Weld studs in accordance with AWS D1.1. Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop. Paint portions of steel sections not in contact with concrete with the primer specified for System II paint. Shop drawings for the fabrication of Sealed Expansion Joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the Sealed Expansion Joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Sealed Expansion Joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint. Clean and prepare seal cavity for seal installation as per the manufacturer's installation procedures.

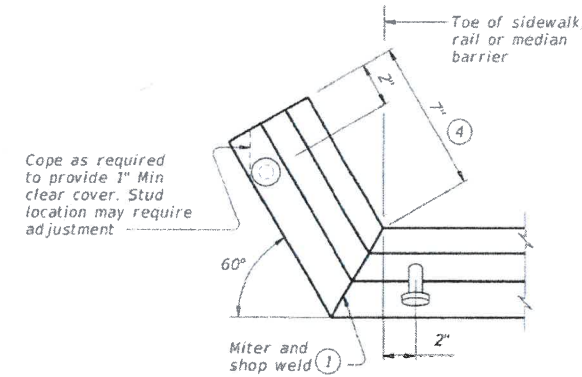
GENERAL NOTES:

Provide Sealed Expansion Joints in the size and at locations shown on the plans. Minimum slab and overhang thickness required for the use of SEJ-A is 6 1/2".



FIELD SPLICE DETAIL

Used for Watson Bowman Acme and D.S. Brown joint systems



UPTURN DETAIL

Used for Watson Bowman Acme and D.S. Brown joint systems

- Remove all burrs which will be in contact with seal prior to making splice.
- Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- These openings are also the recommended minimum installation openings.
- Reduce for sidewalk or parapet heights less than 6".
- Other conditions affecting the joint profile should be noted elsewhere.
- Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- See Span details for location of break point.

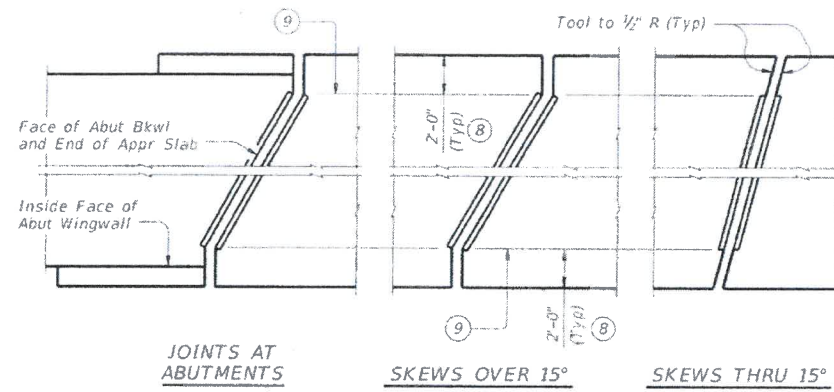
Texas Department of Transportation
Bridge Division Standard

**SEALED EXPANSION JOINT
TYPE A
WITHOUT OVERLAY**

SEJ-A

FILE	sejaste1.dgn	DN: TxDOT	CR: TxDOT	DR: JTR	CL: JMH
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		DIST	COUNTY		SHEET NO

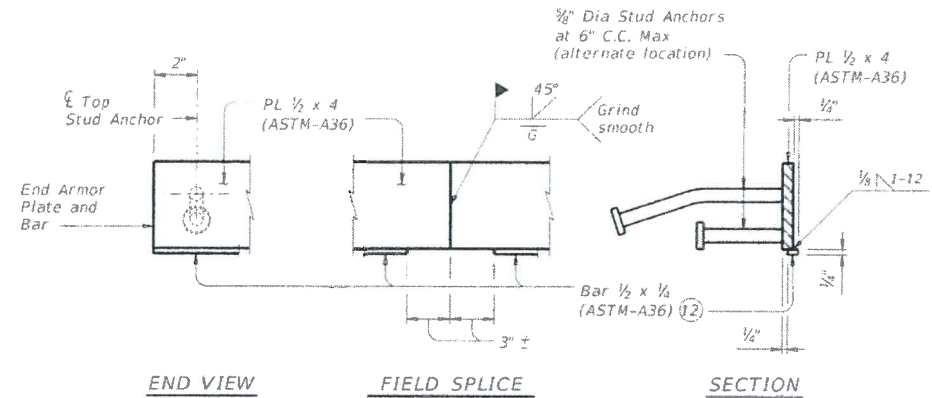
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JOINTS AT ABUTMENTS **SKEWS OVER 15°** **SKEWS THRU 15°**

PLANS OF ARMOR PLATES

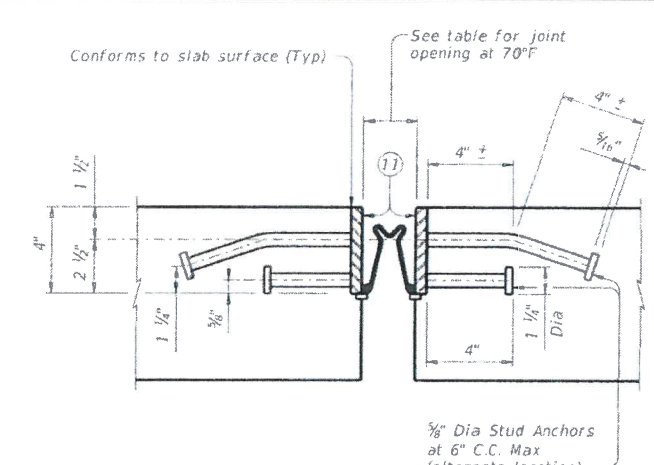
Used for R.J. Watson joint systems



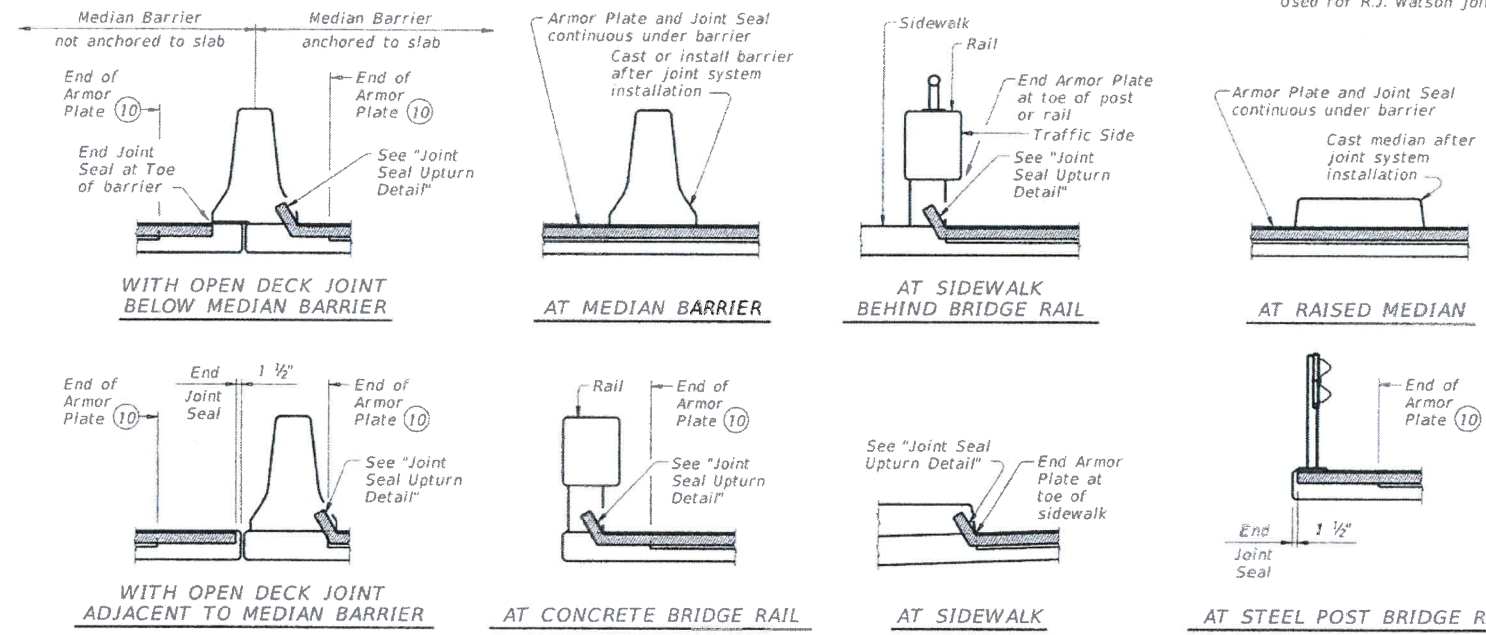
END VIEW **FIELD SPLICE** **SECTION**

ELEVATION OF ARMOR PLATE

Used for R.J. Watson joint systems.

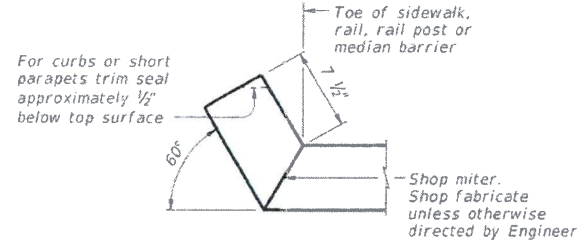


SECTION THRU R J WATSON JOINT



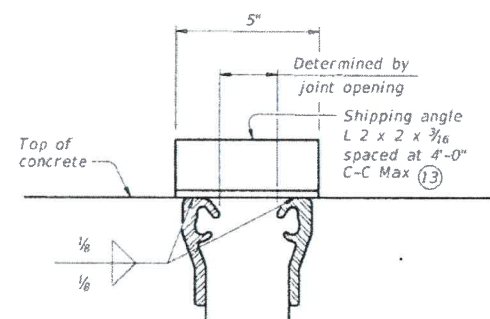
TYPICAL SECTIONS

Used for R.J. Watson joint systems



JOINT SEAL UPTURN DETAIL

Used for R.J. Watson joint systems



SHOWING D.S. BROWN (Ty SSCM2)
Watson Bowman Acme (Type R) and R J Watson similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

- ⑤ Other conditions affecting the joint profile should be noted elsewhere.
- ⑧ Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
- ⑨ At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
- ⑩ See "Plans of Armor Plates".
- ⑪ Coat with manufacturer's supplied epoxy primer above bar before installing sealant.
- ⑫ In lieu of bar, use 3/4", 16 gauge, stainless steel strap. Attach to armor plate with a fastener for attaching steel to steel base material, such as Hilti X-EGN or X-S13.
- ⑬ Align shipping angle perpendicular to joint.

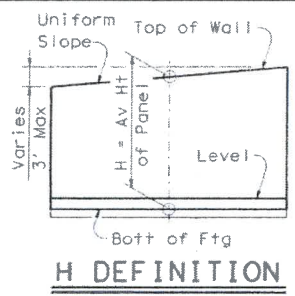
CONSTRUCTION NOTE FOR R.J. WATSON JOINT:
Splice and install seal in accordance with the manufacturer's directions and with the adhesive provided by the manufacturer.

SHEET 2 OF 2

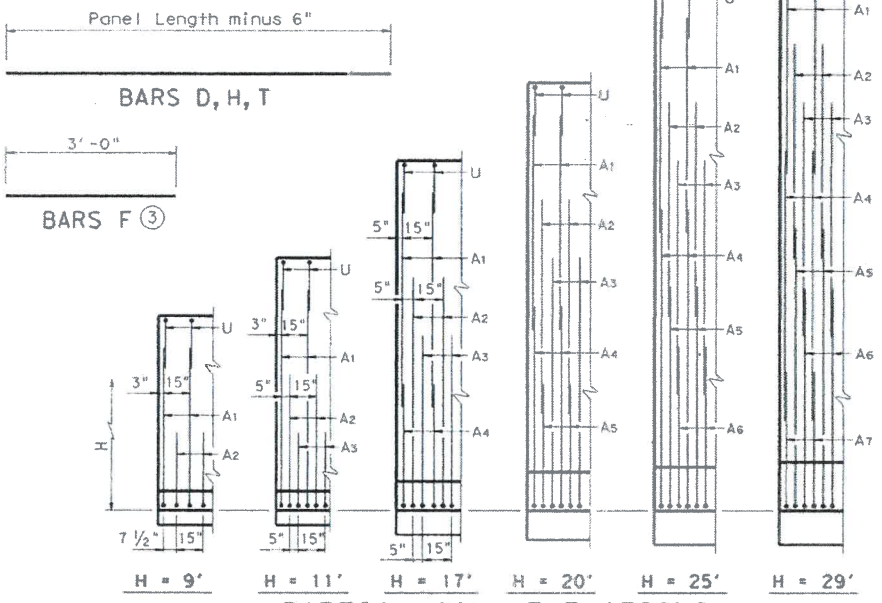
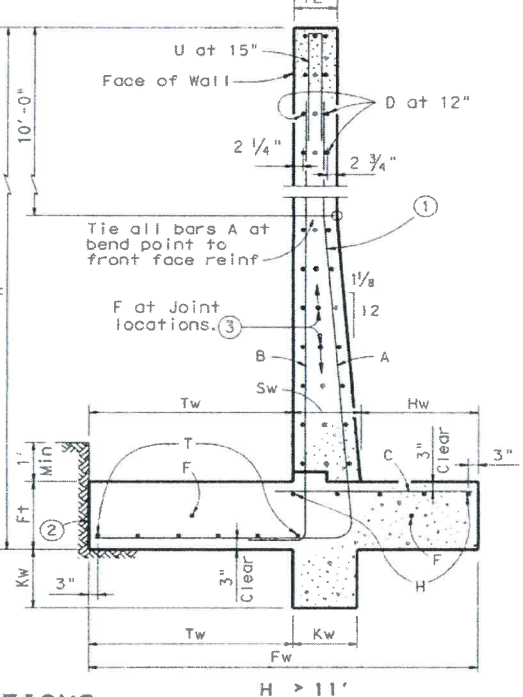
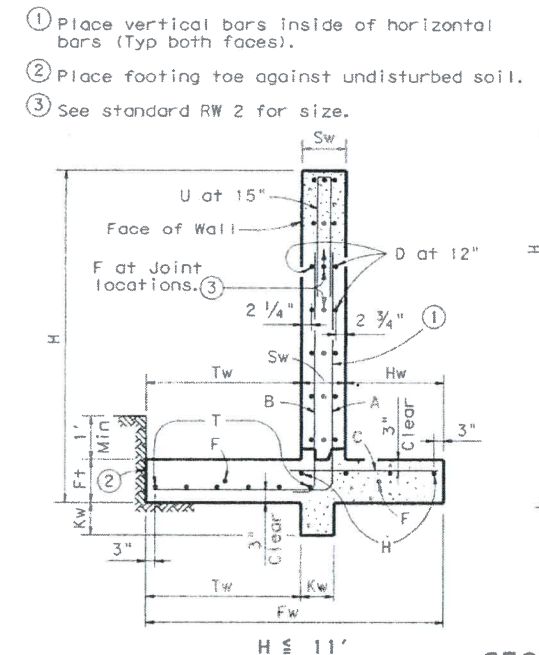
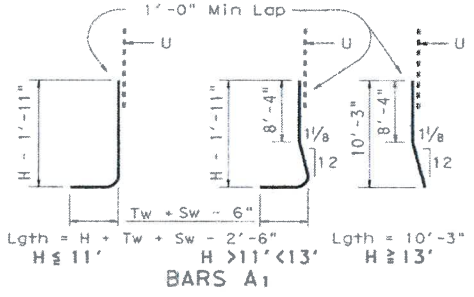
		Bridge Division Standard	
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY			
SEJ-A			
FILE: sejuste1.dgn	DR: TxDOT	CK: TxDOT	DN: JTR
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Wall Height "H" (Ft)	WALL DIMENSIONS							Max Soil Press T/SF	REINFORCING STEEL FOR ONE 32' PANEL (DESIGN C)																							QUANTITY FOR ONE 32' PANEL		Wall Height "H" (Ft)
	Fw	Tw	Sw	Hw	Ft	Kw	Lgth		Wt	A1 ~ 26 #5 at 15" c-c	A2 ~ 25 #6 at 15" c-c	A3 ~ 25 #7 at 15" c-c	A4 ~ 26 #8 at 15" c-c	A5 ~ 25 #9 at 15" c-c	A6 ~ 25 #11 at 15" c-c	A7 ~ 26 #11 at 15" c-c	B ~ 26 #5		C		D (#5) at 12" c-c	Dowel F at 12" c-c	H (#5) at 12" c-c	T (#5) at 12" c-c	U ~ 26 #5 at 15" c-c		CONC (CY)	REINF (LB)						
	12"	12"	12"	12"	12"	12"	12"		12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"			
2	3'-6"	1'-9"	1'-0"	9"	1'-0"	9"	0.14																						6.0	458	2			
3	4'-3"	2'-2"	1'-0"	1'-1"	1'-0"	9"	0.17																						8.1	626	3			
4	5'-0"	2'-6"	1'-0"	1'-6"	1'-0"	9"	0.20	5'-0"	136																				10.1	991	4			
5	5'-8"	2'-10"	1'-0"	1'-10"	1'-0"	9"	0.24	6'-4"	172																				12.1	1193	5			
6	6'-4"	3'-2"	1'-0"	2'-2"	1'-0"	9"	0.28	7'-8"	208																				14.1	1336	6			
7	7'-0"	3'-6"	1'-0"	2'-6"	1'-0"	9"	0.32	9'-0"	244	4'-2"	156																		16.1	1698	7			
8	7'-9"	3'-10"	1'-0"	2'-11"	1'-0"	9"	0.35	10'-4"	280	5'-4"	200																		18.1	2056	8			
9	8'-6"	4'-3"	1'-0"	3'-3"	1'-0"	9"	0.37	11'-9"	319	6'-7"	247																		20.2	2268	9			
10	9'-2"	4'-7"	1'-0"	3'-7"	1'-0"	9"	0.41	13'-1"	355	7'-8"	288	6'-9"	345																22.2	2981	10			
11	9'-10"	4'-11"	1'-0"	3'-11"	1'-0"	9"	0.44	14'-5"	391	8'-11"	335	8'-1"	413																24.7	3382	11			
12	10'-6"	5'-3"	1'-1 1/8"	4'-1 1/8"	1'-0"	9"	0.45	15'-10"	429	10'-1"	379	9'-6"	485																26.7	3868	12			
13	11'-2"	5'-7"	1'-2"	4'-5"	1'-3"	9"	0.54	10'-3"	278	11'-2"	419	10'-11"	558	8'-5"	584														32.5	4591	13			
14	11'-10"	5'-11"	1'-3 1/8"	4'-7 1/8"	1'-3"	9"	0.57	10'-3"	278	12'-5"	466	12'-4"	630	9'-10"	683														34.9	4986	14			
15	12'-6"	6'-3"	1'-4"	4'-11"	1'-6"	9"	0.63	10'-3"	278	13'-7"	510	13'-9"	703	11'-2"	775														40.8	5298	15			
16	13'-3"	6'-7"	1'-5"	5'-3"	1'-6"	9"	0.66	10'-3"	278	14'-9"	554	15'-2"	775	12'-8"	879														44.5	5672	16			
17	13'-10"	6'-11"	1'-6 1/4"	5'-4 3/4"	1'-6"	9"	0.70	10'-3"	278	15'-11"	598	16'-7"	847	14'-1"	978														47.3	6308	17			
18	14'-6"	7'-3"	1'-7"	5'-8"	1'-9"	9"	0.76	10'-3"	278	11'-2"	419	18'-0"	920	15'-5"	1070	9'-7"	815												54.2	7298	18			
19	15'-2"	7'-7"	1'-8 1/8"	5'-10 1/8"	1'-9"	9"	0.79	10'-3"	278	11'-2"	419	19'-5"	992	16'-11"	1174	10'-11"	928												57.5	7743	19			
20	16'-0"	8'-0"	1'-9 1/4"	6'-2 1/4"	1'-9"	9"	0.80	10'-3"	278	11'-2"	419	20'-11"	1069	18'-5"	1278	12'-4"	1048												61.3	8613	20			
21	16'-6"	8'-3"	1'-10 1/8"	6'-4 1/8"	2'-0"	9"	0.88	10'-3"	278	11'-2"	419	22'-3"	1137	19'-9"	1371	13'-7"	1155												68.8	9033	21			
22	17'-3"	8'-7"	1'-11 1/4"	6'-8 1/4"	2'-0"	9"	0.91	10'-3"	278	11'-2"	419	12'-2"	622	21'-2"	1469	15'-0"	1275	6'-1"	808										72.8	9729	22			
23	18'-0"	9'-0"	2'-0 1/8"	6'-11 1/8"	2'-3"	9"	0.95	10'-3"	278	11'-2"	419	12'-2"	622	22'-8"	1574	16'-4"	1388	7'-1"	941										81.7	10314	23			
24	18'-6"	9'-4"	2'-1 1/4"	7'-0 1/4"	2'-3"	9"	0.99	10'-3"	278	11'-2"	419	12'-2"	622	17'-8"	1672	17'-8"	1502	8'-1"	1074										85.4	11372	24			
25	19'-3"	9'-7"	2'-2 3/8"	7'-5 3/8"	2'-3"	9"	1.03	10'-3"	278	11'-2"	419	12'-2"	622	25'-5"	1764	19'-0"	1615	9'-1"	1206										91.0	11909	25			
26	20'-0"	10'-0"	2'-3 1/2"	7'-8 1/2"	2'-3"	9"	1.05	10'-3"	278	11'-2"	419	12'-2"	622	27'-0"	1874	20'-5"	1735	10'-1"	1339										95.6	12491	26			
27	20'-6"	10'-4"	2'-4 5/8"	7'-9 3/8"	2'-3"	9"	1.09	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	21'-9"	1849	11'-1"	1472	17'-0"	2348								99.7	15132	27			
28	21'-3"	10'-7"	2'-5 3/4"	8'-2 1/4"	2'-3"	9"	1.13	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	23'-0"	1955	12'-1"	1605	18'-4"	2533	27'-6"	746					104.6	15825	28				
29	22'-0"	11'-0"	2'-6 1/2"	8'-5 1/2"	2'-6"	9"	1.17	10'-3"	278	11'-2"	419	12'-2"	622	14'-4"	995	24'-5"	2075	13'-1"	1738	19'-10"	2740	28'-6"	773					115.3	16454	29				

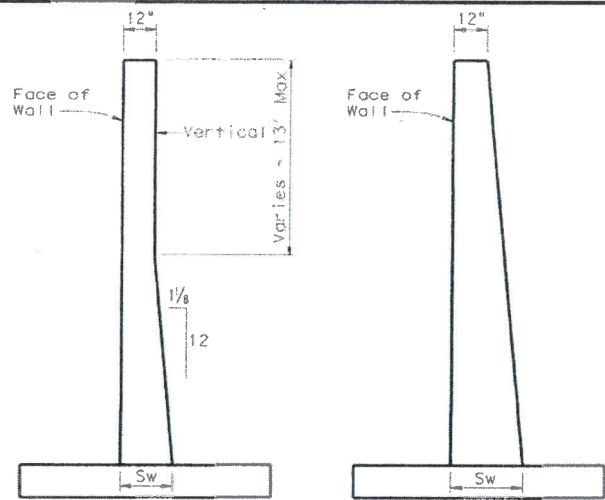


GENERAL NOTES:
 All concrete to be Class "C".
 All reinforcing steel to be Grade 60.
 For notes and details not shown on this sheet see sheet RW2.
 Quantities are based on "H" being average height of panel.
 Retaining Walls are designed as follows on Retaining Wall Layout Sheets.
 HC - 21 - 28
 LA - 28 - 32
 Panel Length ~ 32' is standard; 28' requires special quantities
 Average Height "H" of panel
 Design - A = no surcharge or slope above wall
 B = slopes up to 4:1
 C = traffic surcharge and/or slopes up to 2.5:1
 Footing pressure design - L = low, H = high

					Bridge Division Standard				
<h1>RETAINING WALLS</h1>									
<h2>RW 1(L)C</h2>									
DW: rwtdd07.dgn		DW: TxDOT		CK: TxDOT		DW: GHO		CK: MPH	
C:\TxDOT		March 2010		CONT SECT		JOB		HIGHWAY	
REVISIONS				DIST			COUNTY		
							SHEET NO.		

DATE: FILE:

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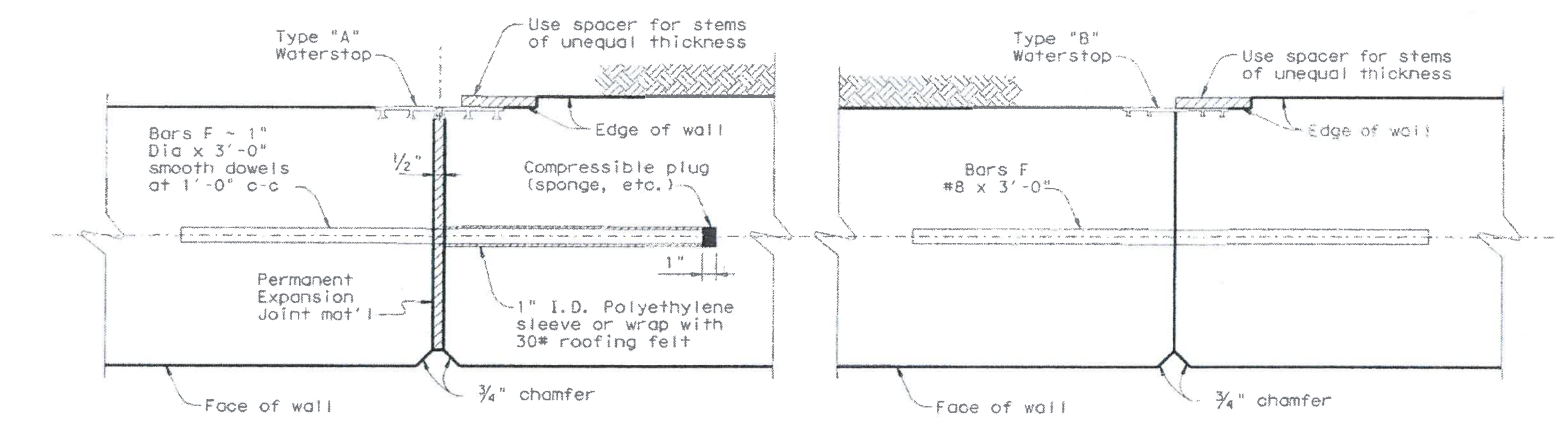


AS DETAILED ALL HEIGHTS
(Basis for payment)

FRONT FACE VERTICAL
BACK FACE SLOPED

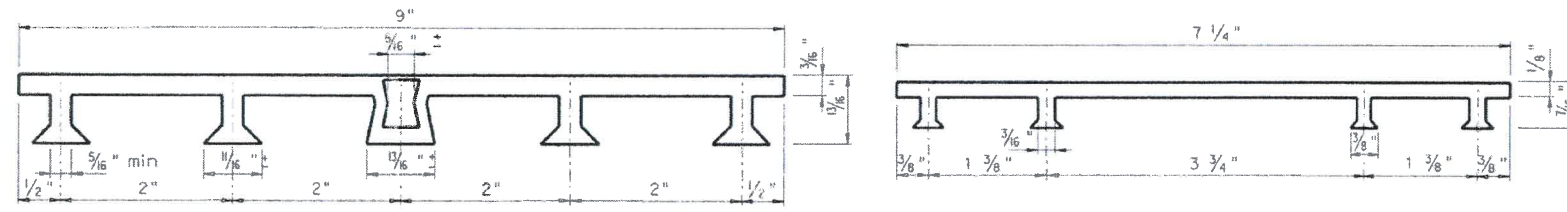
ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than those shown may be used after approval by the Engineer. Sw shall not be less than shown in Table on Sheet 1. No payment will be made for excess concrete due to changing of slope of wall stem.



EXPANSION JOINT

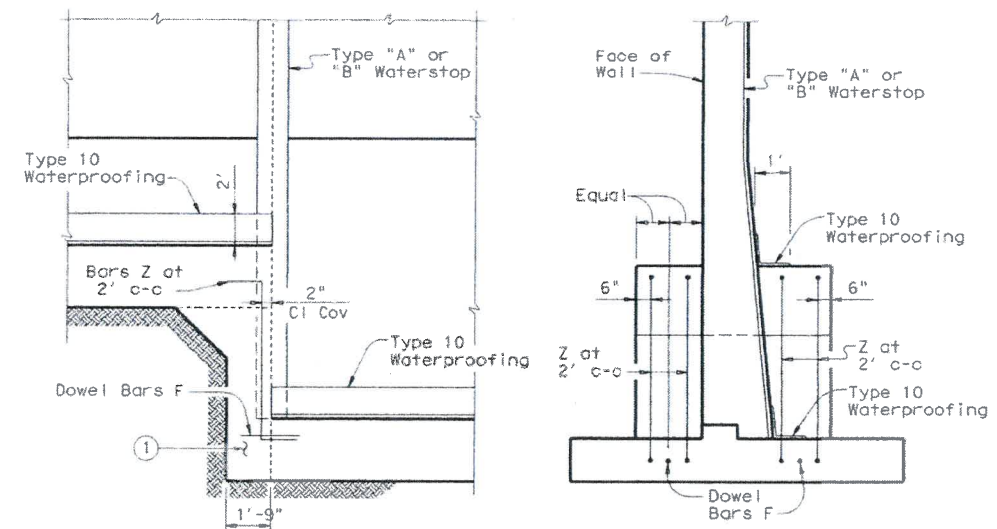
CONSTRUCTION JOINT



PVC WATERSTOP TYPE "A"

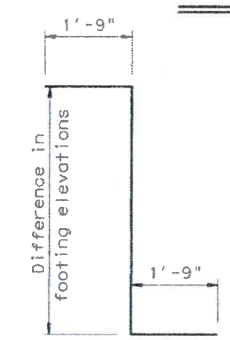
PVC WATERSTOP TYPE "B"

Note: Dimensions and shapes may vary slightly depending on manufacturer.

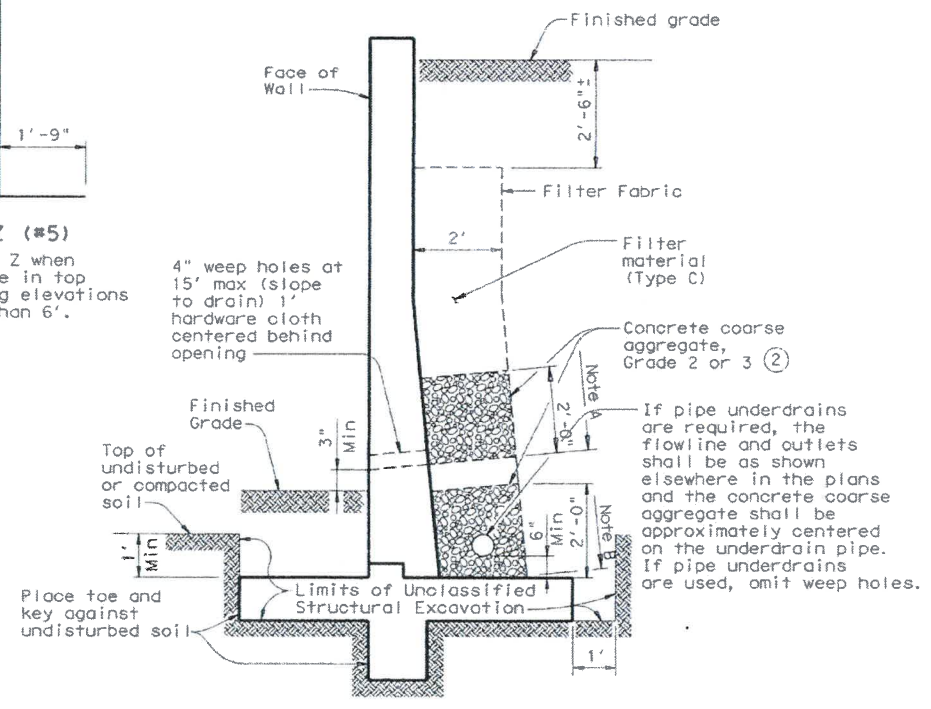


**PARTIAL ELEVATION
SHOWING WATERSTOP AT FOOTING JOINT**

① Unreinforced Class "C" Concrete when difference in top of footing elevations is less than 6'. Omit when Dowel Bars F can be placed between adjacent footings with 4" cover top and bottom.



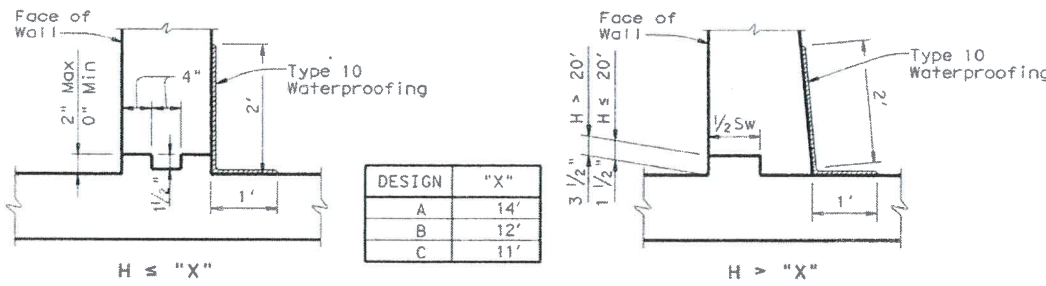
BARS Z (#5)
Omit Bars Z when difference in top of footing elevations is less than 6'.



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

Note A: Stop coarse aggregate at this level when weep holes are used.
Note B: Use coarse aggregate to here with filter material above when underdrains are used.

GENERAL NOTES:
 Walls are designed assuming unit weight of soil = 120 pcf, and coefficient of horizontal earth pressure = 0.33.
 Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of Key up, shall not be less than $K_w + F_t + 1'$.
 Retaining walls are detailed to be placed on grades up thru 10% with footing level, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A₁ and B and increasing length of legs of Bars U by the same amount. No change in quantities will be involved.
 Retaining walls may be placed on Horizontal Curves by adjusting lengths of footing Bars T and H. Minor revisions of Concrete Quantities may be required.
 Designed in accordance with current AASHTO Standard and Interim Specifications.
 All concrete to be Class "C".
 All reinforcing steel to be Grade 60.



JOINT AND WATERSTOP DETAILS

DESIGN	"X"
A	14'
B	12'
C	11'

Texas Department of Transportation
 Bridge Division Standard

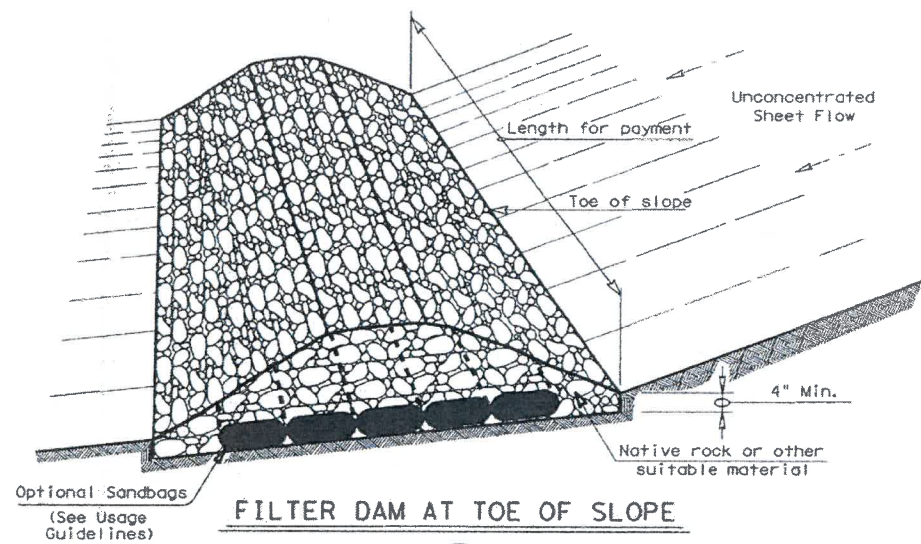
RETAINING WALL MISCELLANEOUS DETAILS

RW 2

FILE: rwsdell.dgn	DR: TxDOT	CK: TxDOT	DN: JGD	CR: HJG
© TxDOT March 2010	CNT	SECT	JOB	HIGHWAY
REVISIONS				
04-11: Added Note 2.	DIST	COUNTY	SHEET NO.	

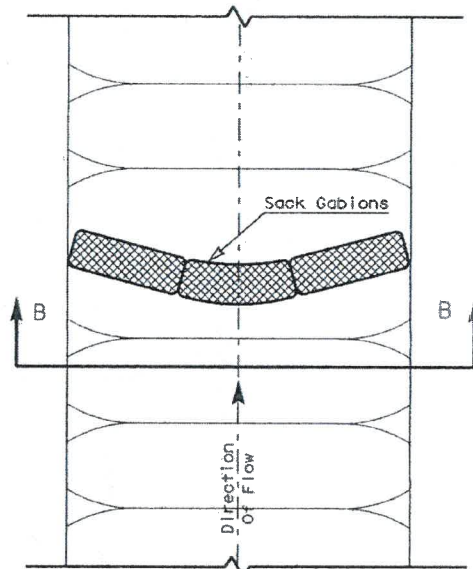
DATE: FILE:

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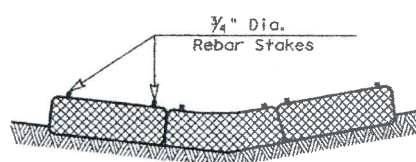


FILTER DAM AT TOE OF SLOPE

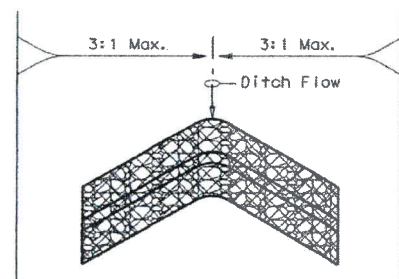
RFD1
TYPE 1



PLAN VIEW



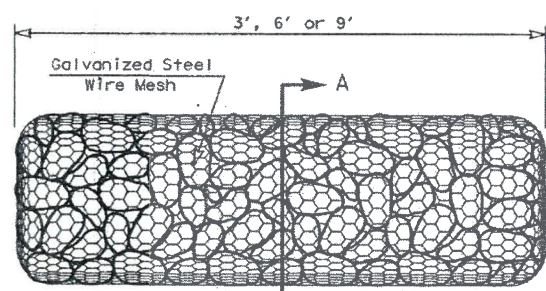
SECTION B-B



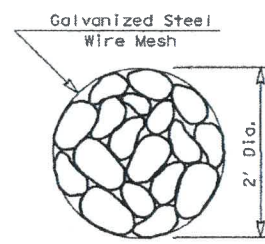
**"V" SHAPE
(Plan View)**

PLANS SHEET LEGEND

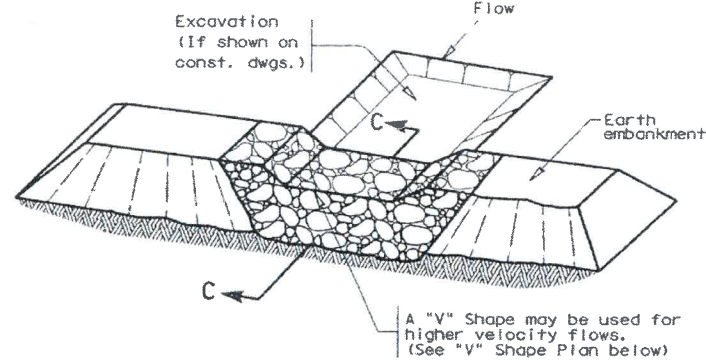
- Type 1 Rock Filter Dam — RFD1
- Type 2 Rock Filter Dam — RFD2
- Type 3 Rock Filter Dam — RFD3



TYPE 4 (SACK GABIONS)

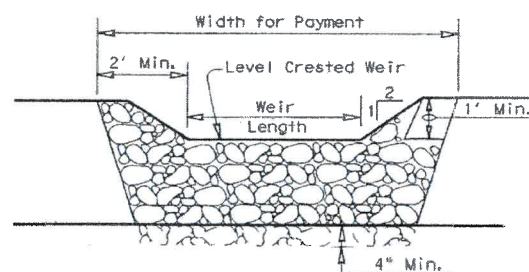


SECTION A-A

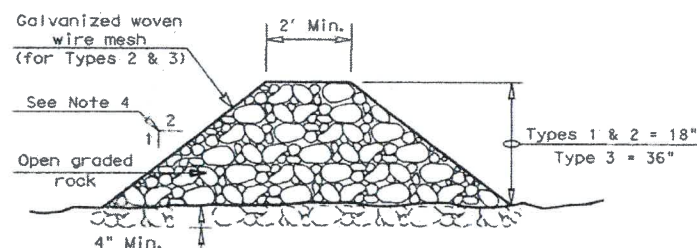


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2
TYPE 1 OR TYPE 2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

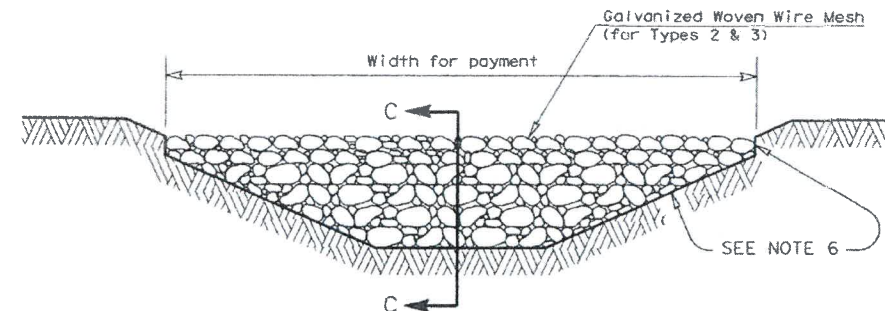
Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approx. 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions): Type 4 May be used in ditches and smaller channels to form an erosion control dam.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3
TYPE 1 OR TYPE 2

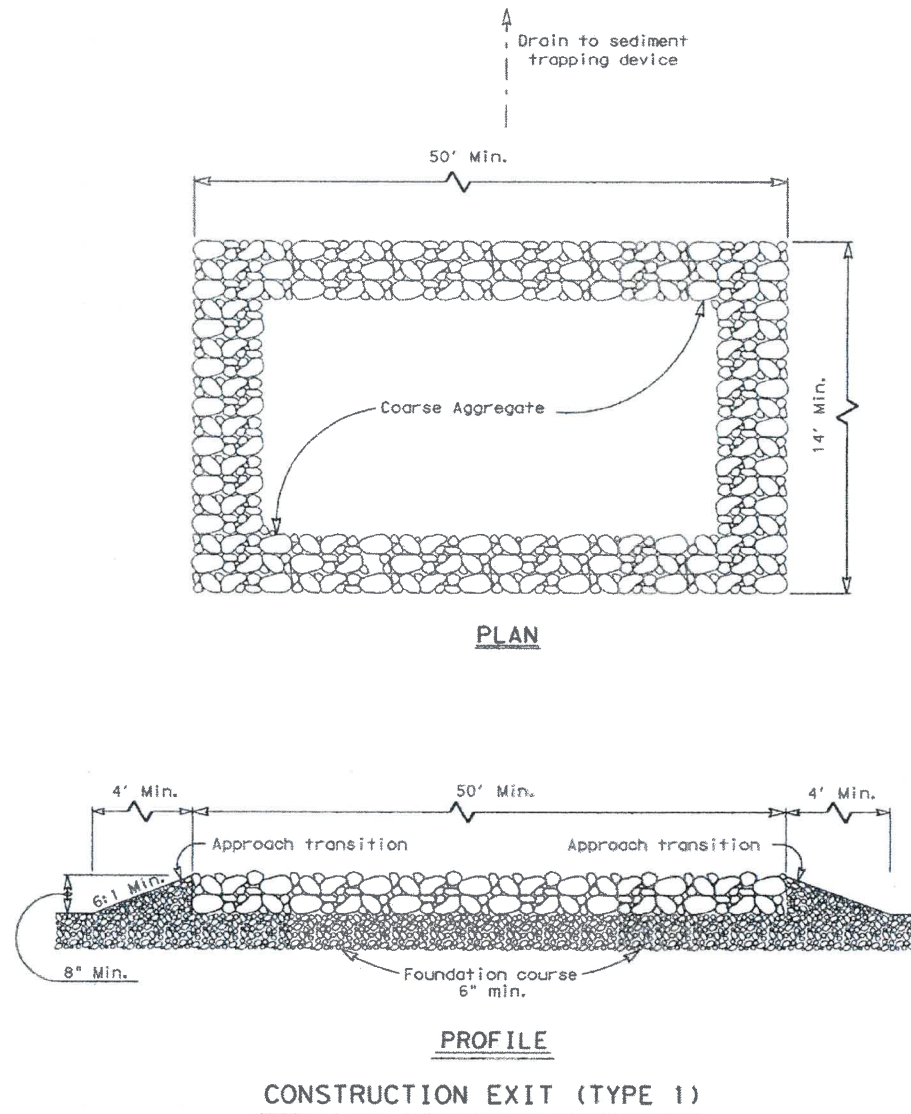
GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. In stream use the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 1/4" dia. rebar stakes.
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC(2)-93			
FILE: ec293.dgn	DATE: TxDOT	CHK: HEJ	DR: BD
©TxDOT June 1993	CONT: SECT	JOB:	HIGHWAY:
REVISIONS:	DIST:	COUNTY:	SHEET NO.:

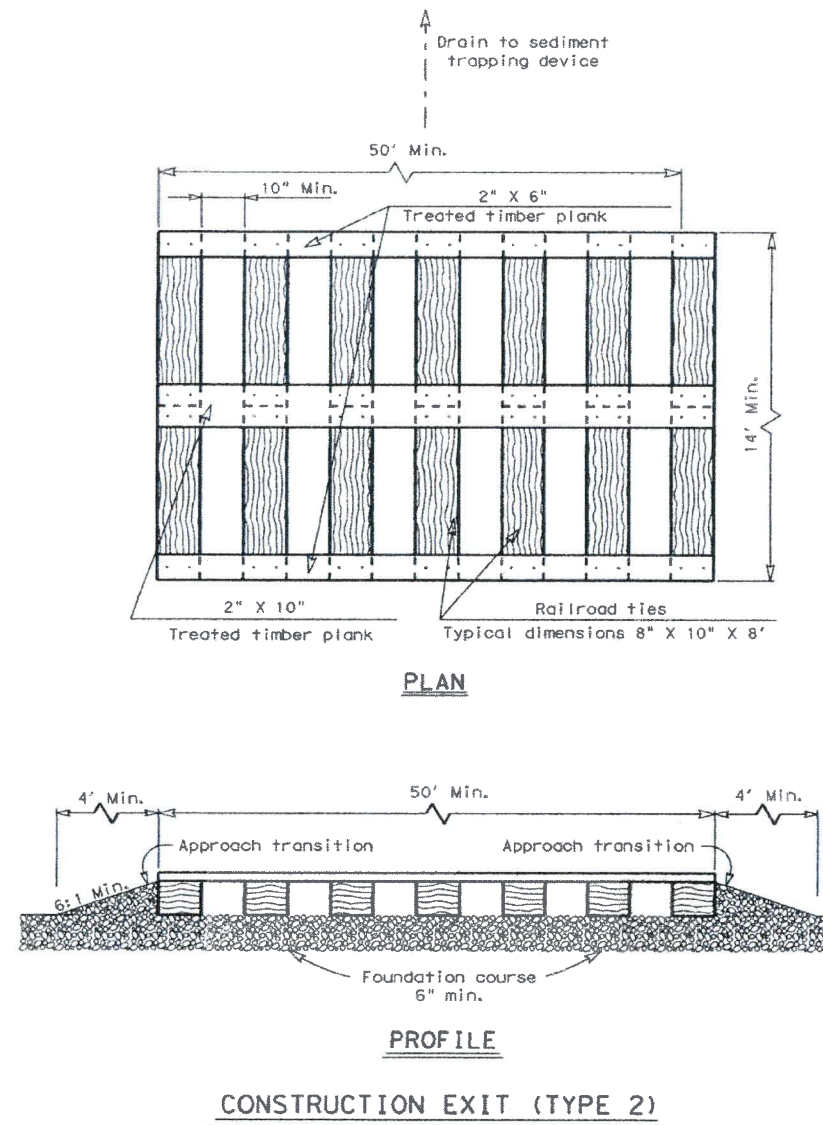
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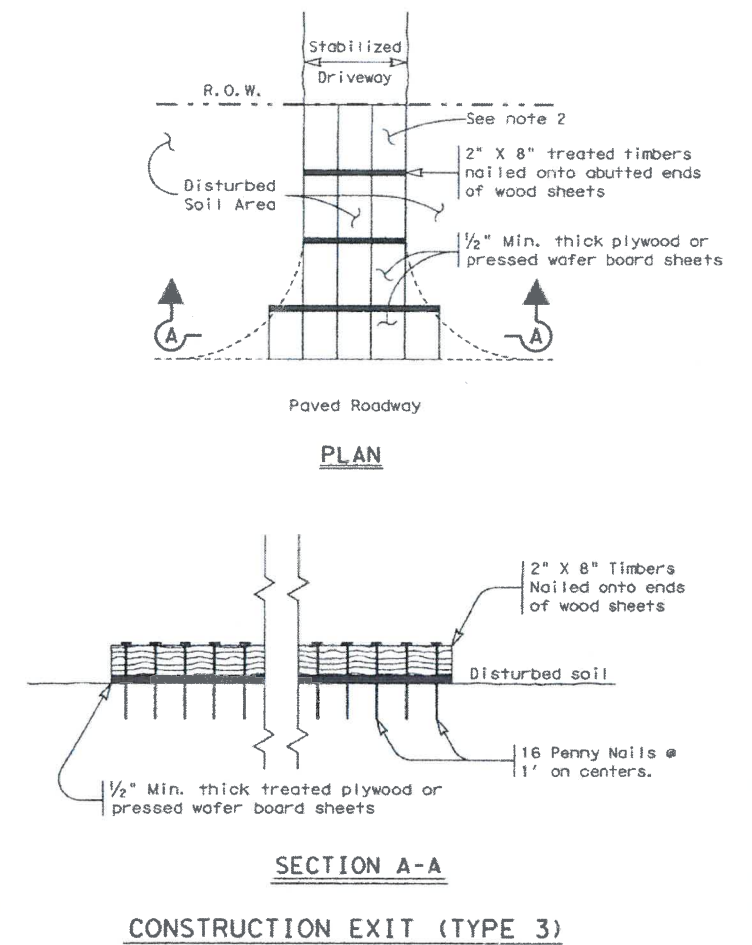
GENERAL NOTES

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



GENERAL NOTES

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



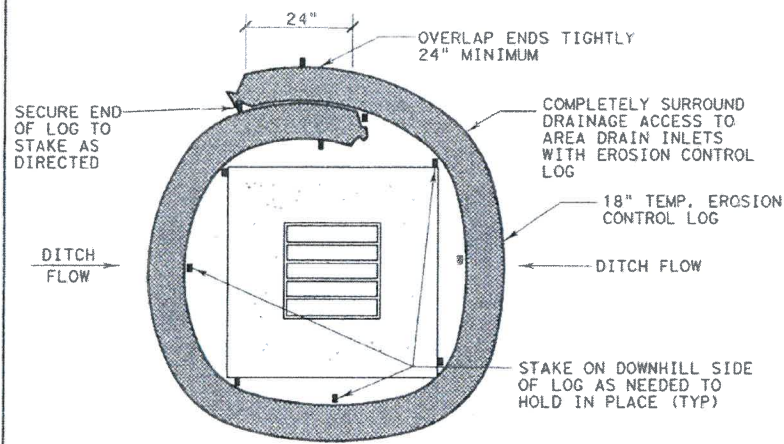
GENERAL NOTES

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

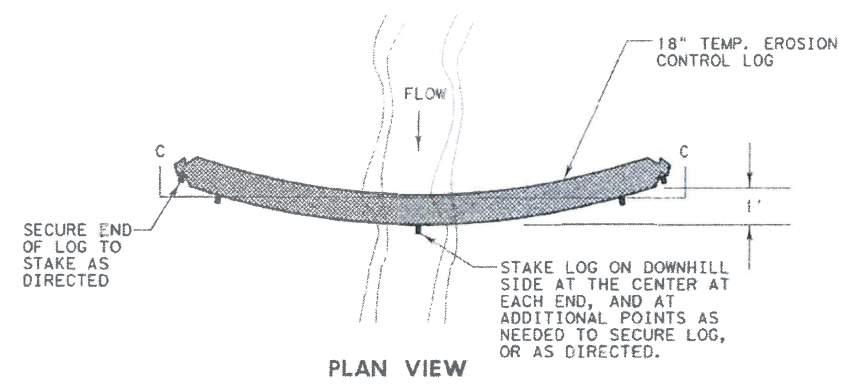
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC (3) - 93			
FILE: ec393.dgn	DATE: TxDOT	CHK: HEJ	DW: BO
© TxDOT June 1993	CONT	SECT	JOB
REVISIONS			HIGHWAY
	BIST	COUNTY	SHEET NO.

DATE: FILE:

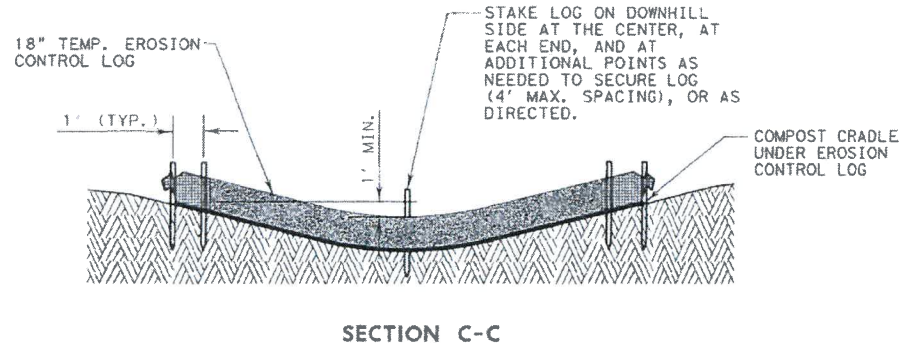
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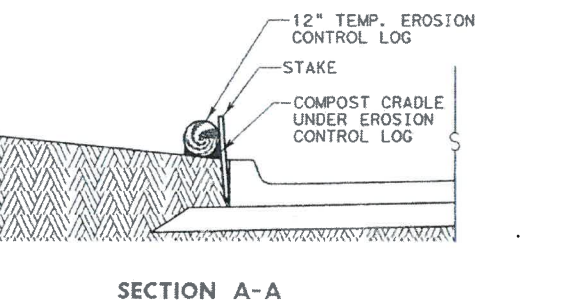
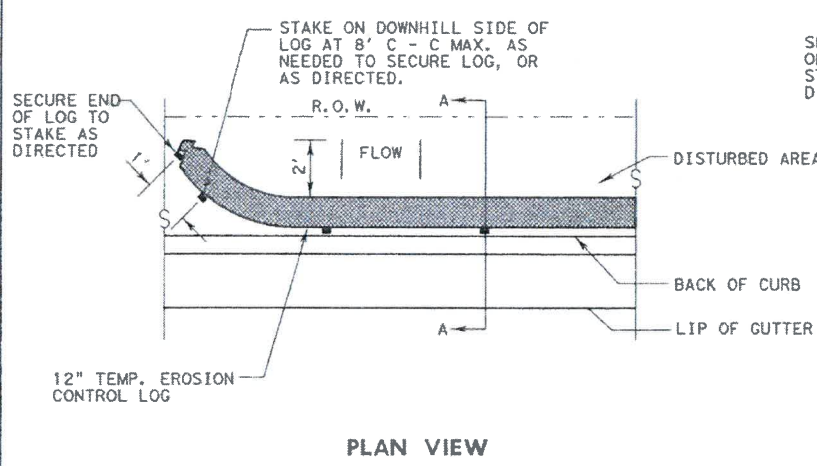
LOGS PLACED AT AREA DRAIN INLETS
NTS



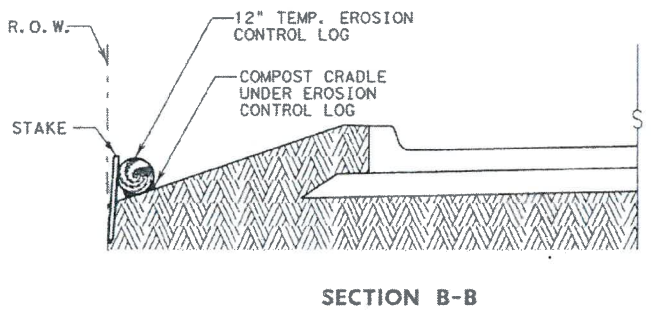
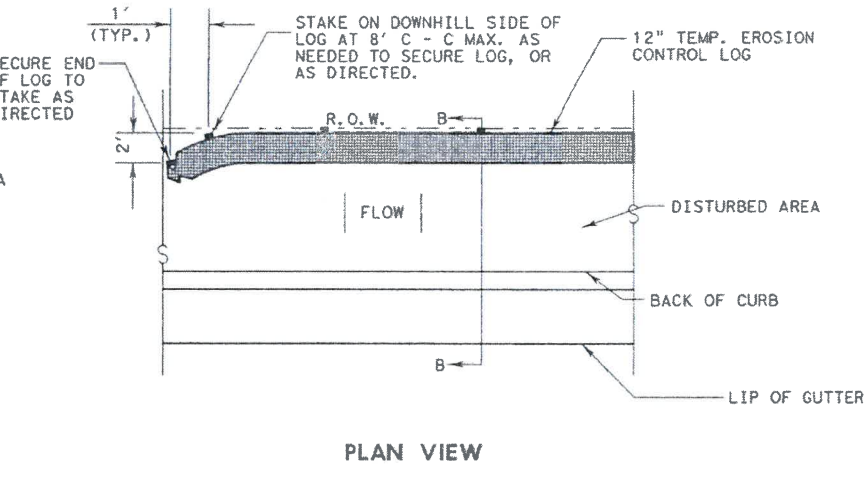
EROSION CONTROL LOG CHECK DAM
NTS



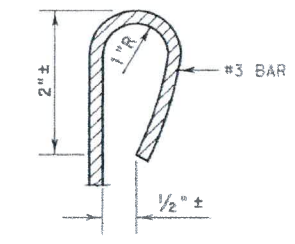
http://www.dot.state.tx.us/ftw/spec/info/standard.htm



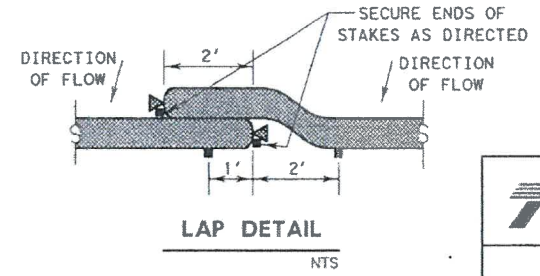
LOG PLACED AT BACK OF CURB
NTS



LOG PLACED AT EDGE OF RIGHT-OF-WAY
NTS



REBAR STAKE DETAIL
NTS



LAP DETAIL
NTS

GENERAL NOTES:

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.

LEVELS DISPLAYED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
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Texas Department of Transportation
© 2005

DALLAS DISTRICT			
EROSION CONTROL LOGS			
SCALE: NOT TO SCALE			
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GRAPHICS	6	(See Title Sheet)	XXXX
CHECK	STATE	DISTRICT	COUNTY
CHECK	TEXAS	DALLAS	XXXXXXXXXX
CHECK	CONTROL	SECTION	JOB
	XXXX	XX	XXX

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

DATE: 9-07 8-14 7-15
 SHEET 9 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT
 BC(5)-14

SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY PORTABLE SKID MOUNTED SIGN SUPPORTS

GROUND MOUNTED SIGN SUPPORTS

PERFORATED SQUARE METAL TUBING

DATE: 9-07 8-14 7-15
 SHEET 10 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT
 BC(5)-14

WEDGE ANCHORS

Both standard plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy stable (approved by the Engineer). See web address for "Traffic Engineering Standard Sheets" on PCVI.

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCO LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Note may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 1/2" x 3 1/2" lag screws must be used on every joint for line connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCO List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

DATE: 9-07 8-14 7-15
 SHEET 11 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT
 BC(5)-14

PORTABLE CHANGEABLE MESSAGE SIGNS

DATE: 9-07 8-14 7-15
 SHEET 12 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
 BC(6)-14

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not explicitly covered here.)

Phase	Condition	Location	Timing	Advance
Phase 1: Closure	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
Phase 2: Possible Component Lists	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM
	ROAD CLOSED	ROAD	BEFORE	XX AM

DATE: 9-07 8-14 7-15
 SHEET 13 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
 BC(6)-14

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

DATE: 9-07 8-14 7-15
 SHEET 14 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR
 BC(7)-14

FLASHING ARROW BOARDS

DATE: 9-07 8-14 7-15
 SHEET 15 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR
 BC(7)-14

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

DATE: 9-07 8-14 7-15
 SHEET 16 OF 29
 Texas Department of Transportation
 Traffic Operations Division
 BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR
 BC(7)-14

WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and raising pavement markings in accordance with the approved specifications and special provisions, or drawings open to traffic when the City limits allow otherwise stated in the plans.
- Color patterns and dimensions shall conform to the Texas Manual for Traffic Control (Texas Manual for Traffic Control) (TMTC) and the Texas Manual for Traffic Control (TMTC) and the Texas Manual for Traffic Control (TMTC).
- Additional supplemental pavement markings details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMTC and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMTC, the plans and as shown on the Standard Sheet 83333333.
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PAUSE signs shall be used to mark the beginning of the section where pausing is prohibited and PAUSE WITH CARE signs at the beginning of sections where pausing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 802, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKINGS

- Raised pavement markings are to be placed according to the patterns on BC12.
- Raised pavement markings used for work zone markings shall meet the requirements of Item 872, "RAISED PAVEMENT MARKINGS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Non-removable prefabricated pavement markings shall meet the requirements of Item 8241.
- Non-removable prefabricated pavement markings shall meet the requirements of Item 8242.

MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor shall be responsible for maintaining work zone pavement markings while the work exists.
- Work zone pavement markings shall be kept in accordance with the frequency and reporting requirements of work zone traffic control device operations as required by Item 530.
- The markings should provide a visible surface for a minimum distance of 200 feet during normal daylight hours and 100 feet when illuminated by automatic low-beam headlights at night, unless other distance is required by other specifications.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 802.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to delivery's place for less than three days, where temporary surface marking devices are used in lieu of markings to define the detour area.
- Pavement markings shall be removed to the fullest extent possible, as well as to leave a discontinue marking 100 feet by any method approved by TMTC Specification Item 877 for "Temporary Lining Pavement Markings and Signs."
- The removal of pavement markings may require resurfacing or road leading portions of the roadway as described in Item 577.
- Subject to the approval of the Engineer, any method that proves to be successful in a particular case may be used.
- Blot coating may be used but shall not be used unless specifically shown in the plans.
- Over-painting of the markings shall NOT BE permitted.
- Removal of raised pavement markings shall be directed by the Engineer.
- Removal of raised pavement markings and markers shall be paid for directly in accordance with Item 877, "TEMPORARY EXISTING PAVEMENT MARKINGS AND MARKERS" unless otherwise stated in the plans.
- Blot and marking tape may be used to mark existing existing markings for periods less than two weeks when approved by the Engineer.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPoxy AND ADHESIVES	DMS-6100
BILMINOVUS ADHESIVE FOR PAVEMENT MARKINGS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8242
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prefabricated reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material-Producer List web address shown on BC12.

SHEET 25 OF 24

Texas Department of Transportation
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE	SCALE	DATE	BY	CHKD	APP'D
1-10	1/4" = 1'-0"	1-10	1-10	1-10	1-10
1-11	1/4" = 1'-0"	1-11	1-11	1-11	1-11
1-12	1/4" = 1'-0"	1-12	1-12	1-12	1-12
1-13	1/4" = 1'-0"	1-13	1-13	1-13	1-13
1-14	1/4" = 1'-0"	1-14	1-14	1-14	1-14

Temporary Flexible-Reflective Roadway Marker Tabs

TOP VIEW

FRONT VIEW

SIDE VIEW

Height of shoring is usually more than 1/4" and less than 1/2".

STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be from the same manufacturer.
- Adhesive for guidemarks shall be voluminous material; applied or laid down not for all surfaces, or the material for concrete surfaces.

Guidemarks shall be designed as:

- YELLOW - two silver reflective surfaces with white body.
- WHITE - one silver reflective surface with white body.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPoxy AND ADHESIVES	DMS-6100
BILMINOVUS ADHESIVE FOR PAVEMENT MARKINGS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8242
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prefabricated reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material-Producer List web address shown on BC12.

SHEET 26 OF 24

Texas Department of Transportation
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE	SCALE	DATE	BY	CHKD	APP'D
1-10	1/4" = 1'-0"	1-10	1-10	1-10	1-10
1-11	1/4" = 1'-0"	1-11	1-11	1-11	1-11
1-12	1/4" = 1'-0"	1-12	1-12	1-12	1-12
1-13	1/4" = 1'-0"	1-13	1-13	1-13	1-13
1-14	1/4" = 1'-0"	1-14	1-14	1-14	1-14

PAVEMENT MARKING PATTERNS

The use of this pattern is governed by the Texas Engineering Practice Act, the approval of the Engineer, and the approval of the City Engineer. The use of this pattern is governed by the Texas Engineering Practice Act, the approval of the Engineer, and the approval of the City Engineer.

PAVEMENT MARKING PATTERNS

RAISED PAVEMENT MARKERS - PATTERN A

RAISED PAVEMENT MARKERS - PATTERN B

REFLECTORIZED PAVEMENT MARKERS - PATTERN A

REFLECTORIZED PAVEMENT MARKERS - PATTERN B

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS

EDGE & LINE LINES FOR DIVIDED HIGHWAY

SHEET 27 OF 24

PAVEMENT MARKING PATTERNS (Continued)

RAISED PAVEMENT MARKERS

REFLECTORIZED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

RAISED PAVEMENT MARKERS

REFLECTORIZED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

SHEET 28 OF 24

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED SPECIFICATIONS AND SPECIAL PROVISIONS, OR DRAWINGS OPEN TO TRAFFIC WHEN THE CITY LIMITS ALLOW OTHERWISE STATED IN THE PLANS.

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

DOUBLE NO-PASSING LINE

SOLID LINES

EDGE LINE OR SINGLE NO-PASSING LINE

WIDE LINE

CENTER LINE OR LANE LINE

BROKEN LINES

AUXILIARY OR LANEDROP LINE

REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

SHEET 29 OF 24

Texas Department of Transportation
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

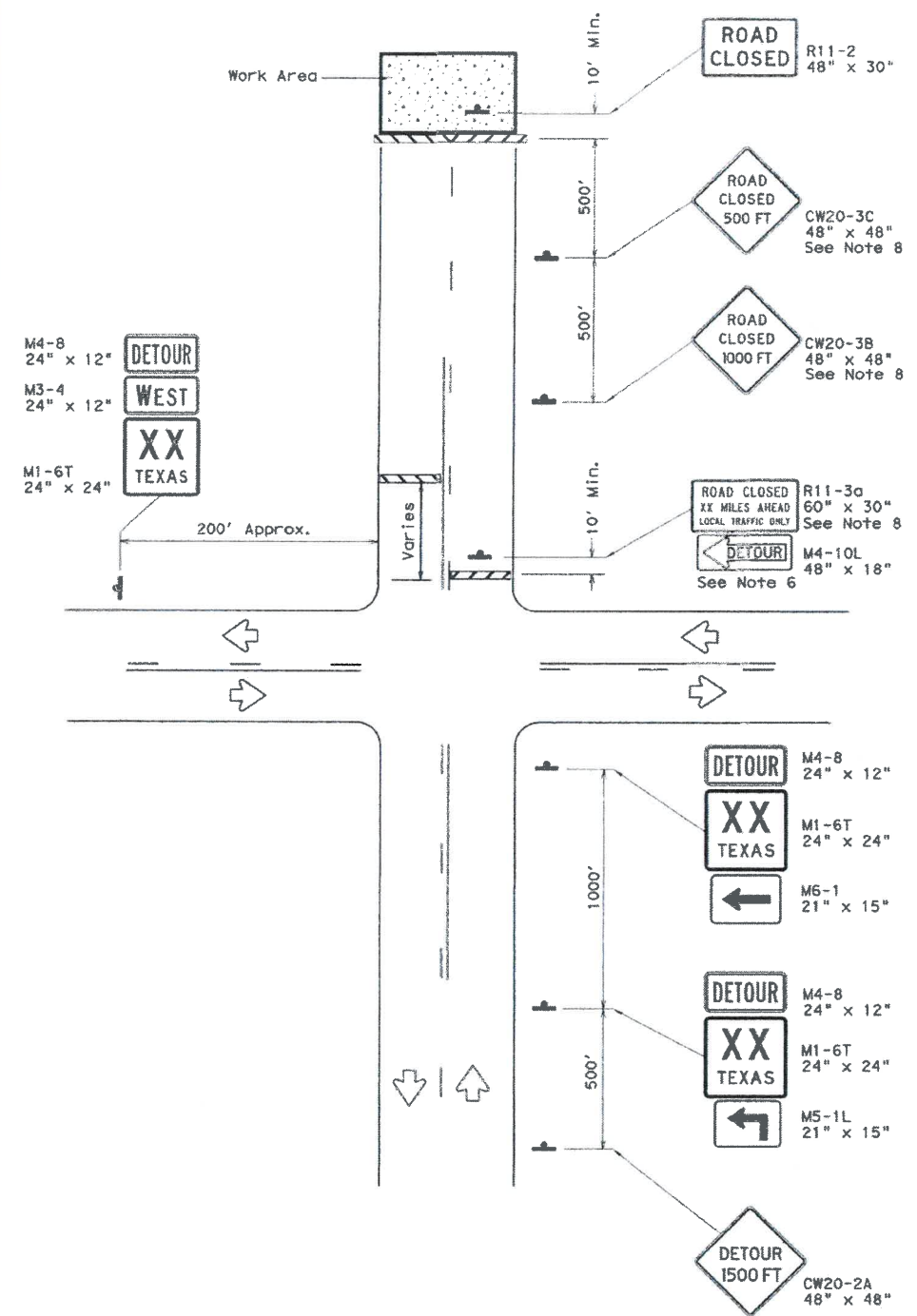
BC(12)-14

FILE	SCALE	DATE	BY	CHKD	APP'D
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1-11	1/4" = 1'-0"	1-11	1-11	1-11	1-11
1-12	1/4" = 1'-0"	1-12	1-12	1-12	1-12
1-13	1/4" = 1'-0"	1-13	1-13	1-13	1-13
1-14	1/4" = 1'-0"	1-14	1-14	1-14	1-14

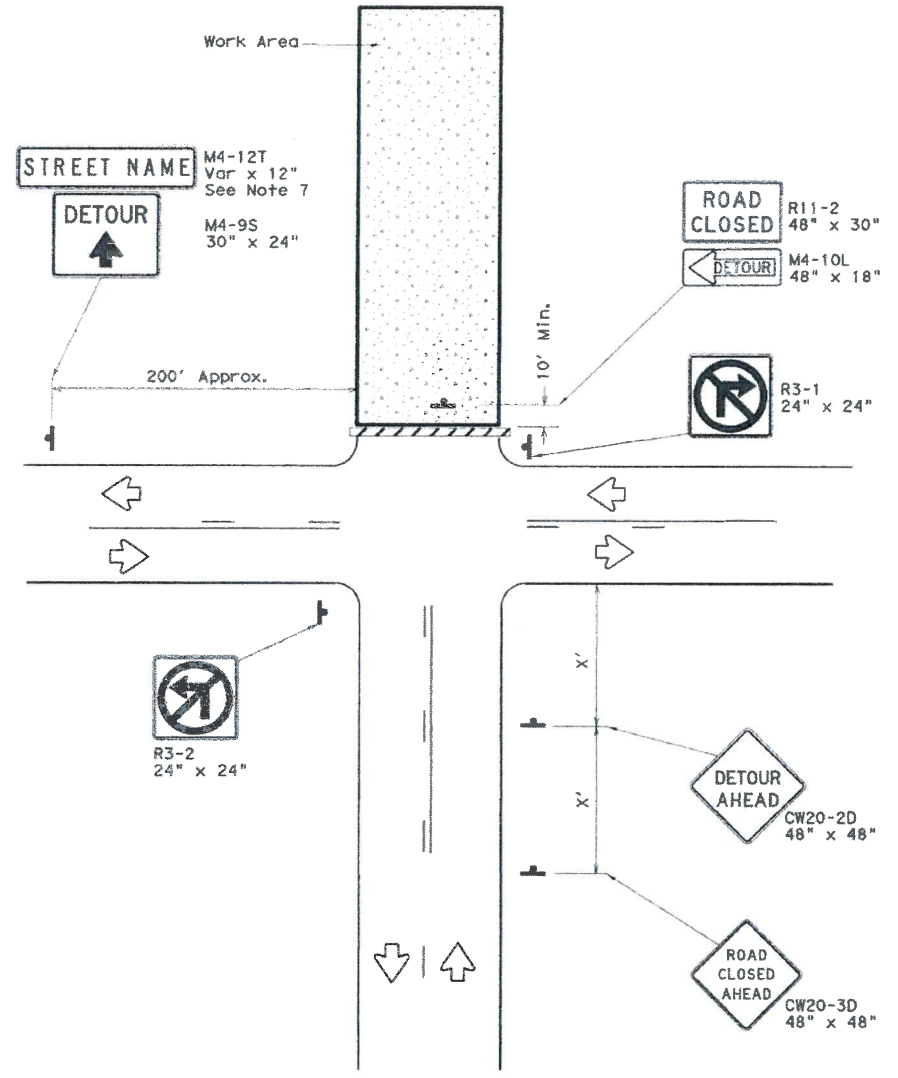
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED SPECIFICATIONS AND SPECIAL PROVISIONS, OR DRAWINGS OPEN TO TRAFFIC WHEN THE CITY LIMITS ALLOW OTHERWISE STATED IN THE PLANS.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



ROAD CLOSURE BEYOND THE INTERSECTION
 Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION
 Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "x" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

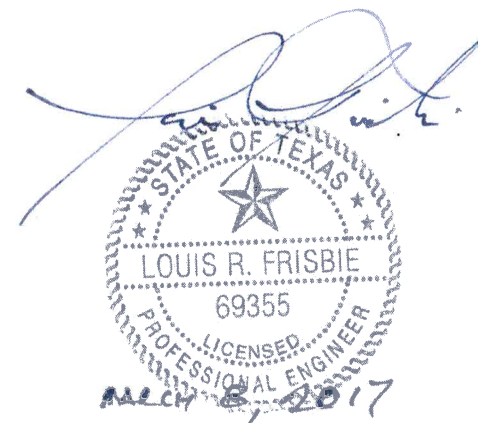
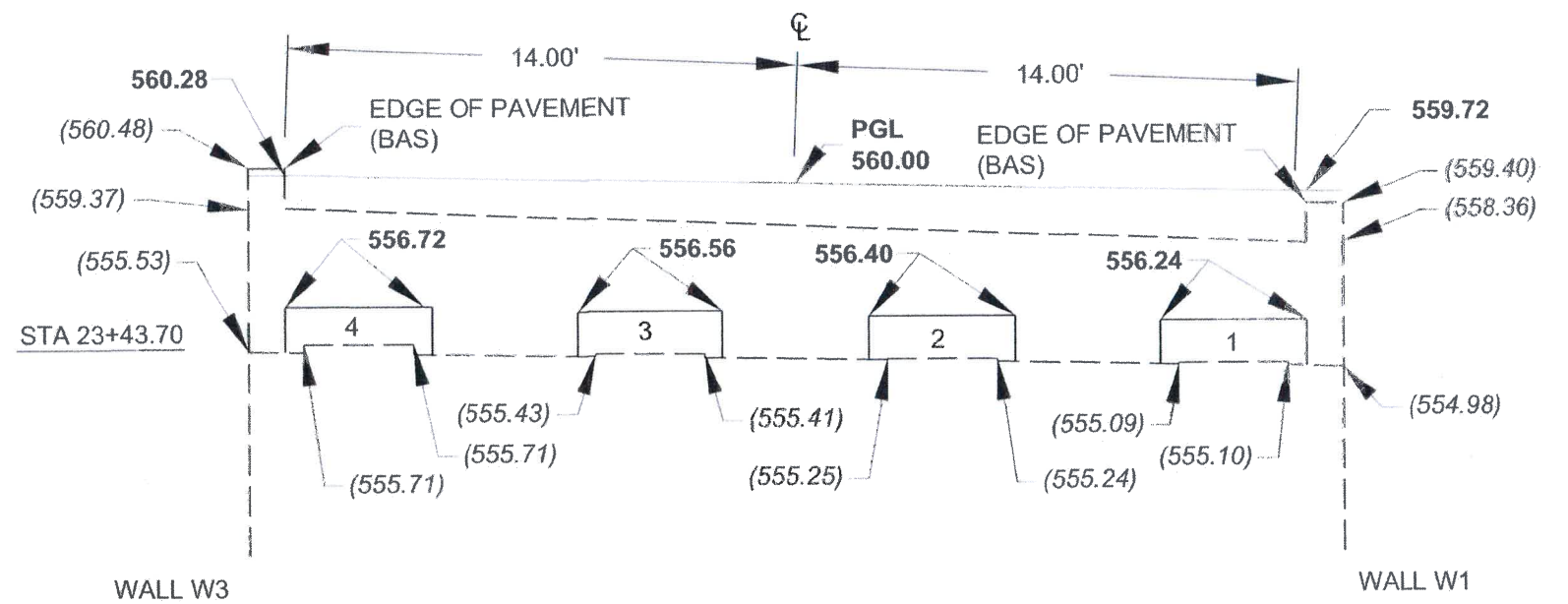
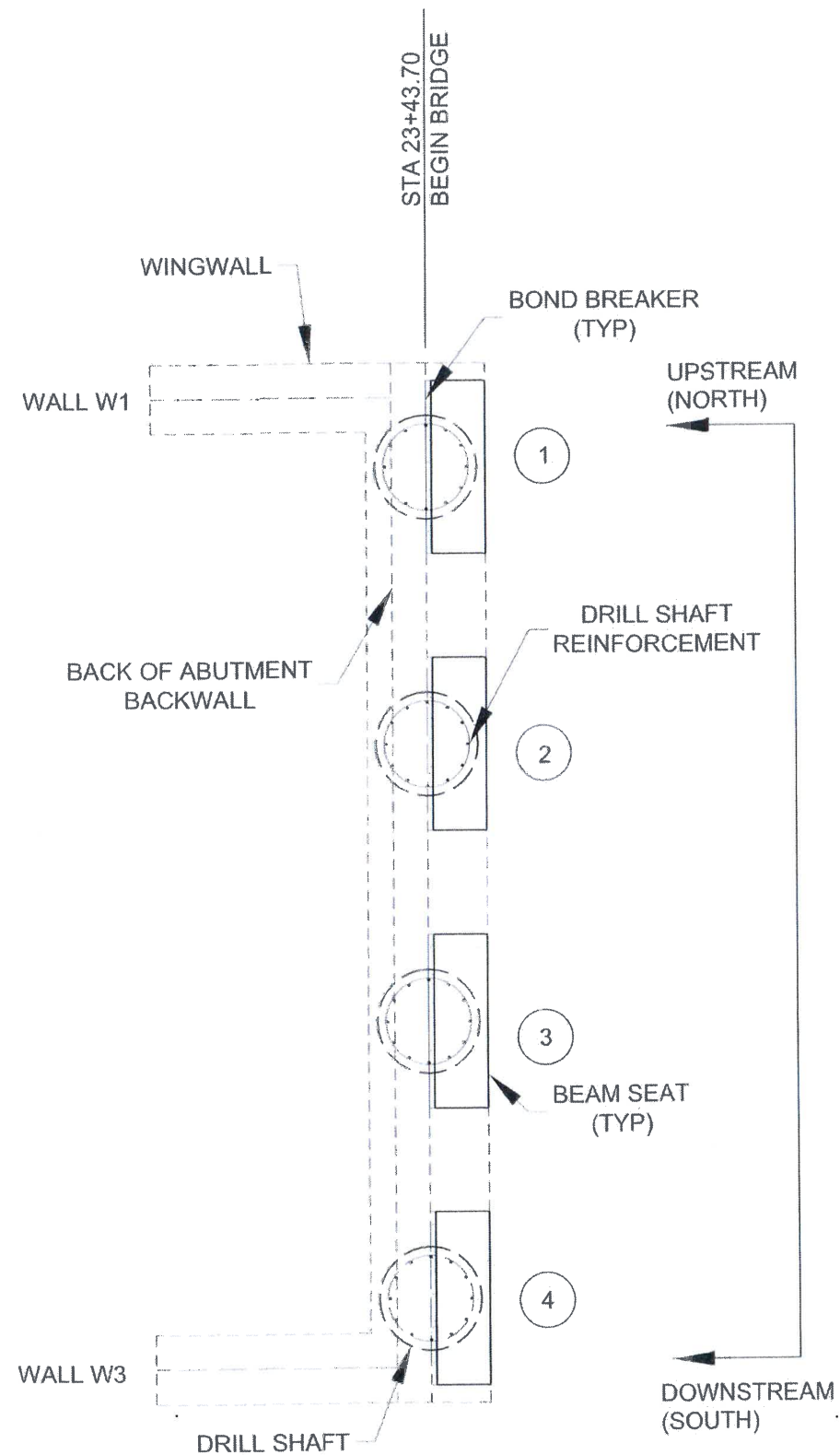
GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

		Traffic Operations Division Standard	
WORK ZONE ROAD CLOSURE DETAILS			
WZ(RCD) - 13			
FILE: w2rcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT August 1995	CONT	SECT	JOB
REVISIONS			
1-97 4-98 7-13	DIST	COUNTY	SHEET NO.
2-98 3-03			

WEST BRIDGE WEST ABUTMENT

KEY		
MI DESIGN ELEVATION		560.00
AS-BUILT/SURVEY ELEVATION		(560.00)



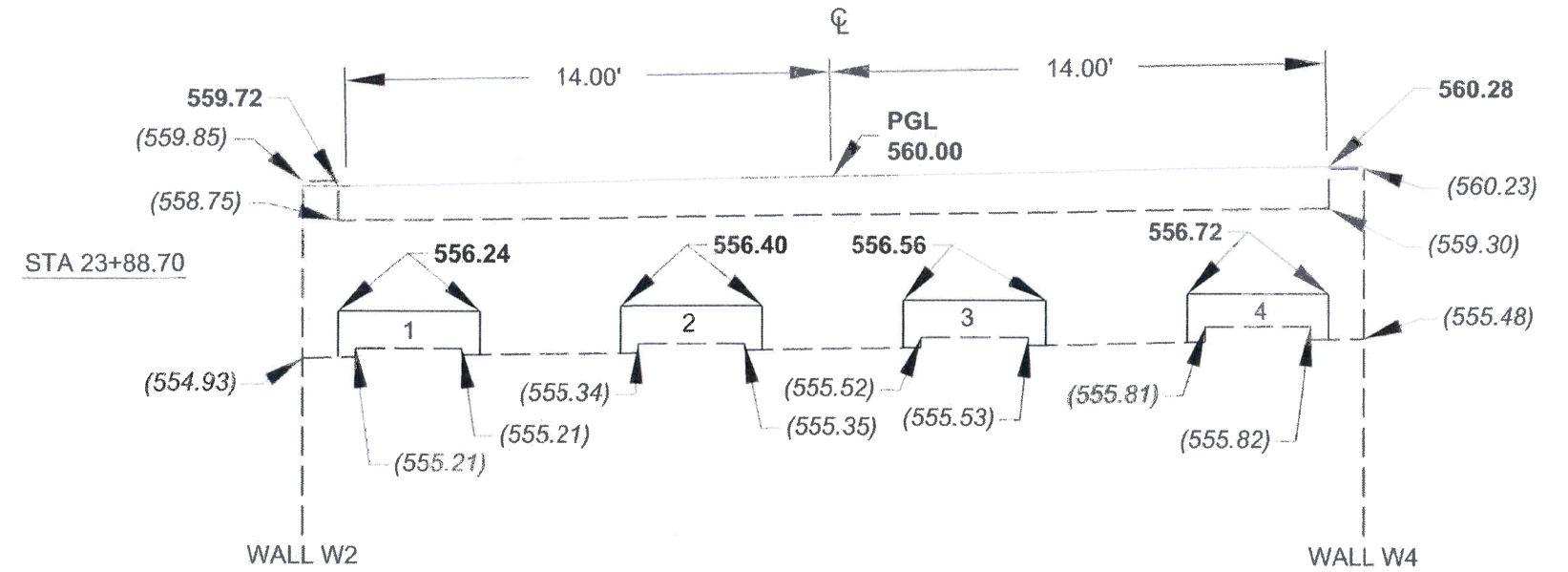
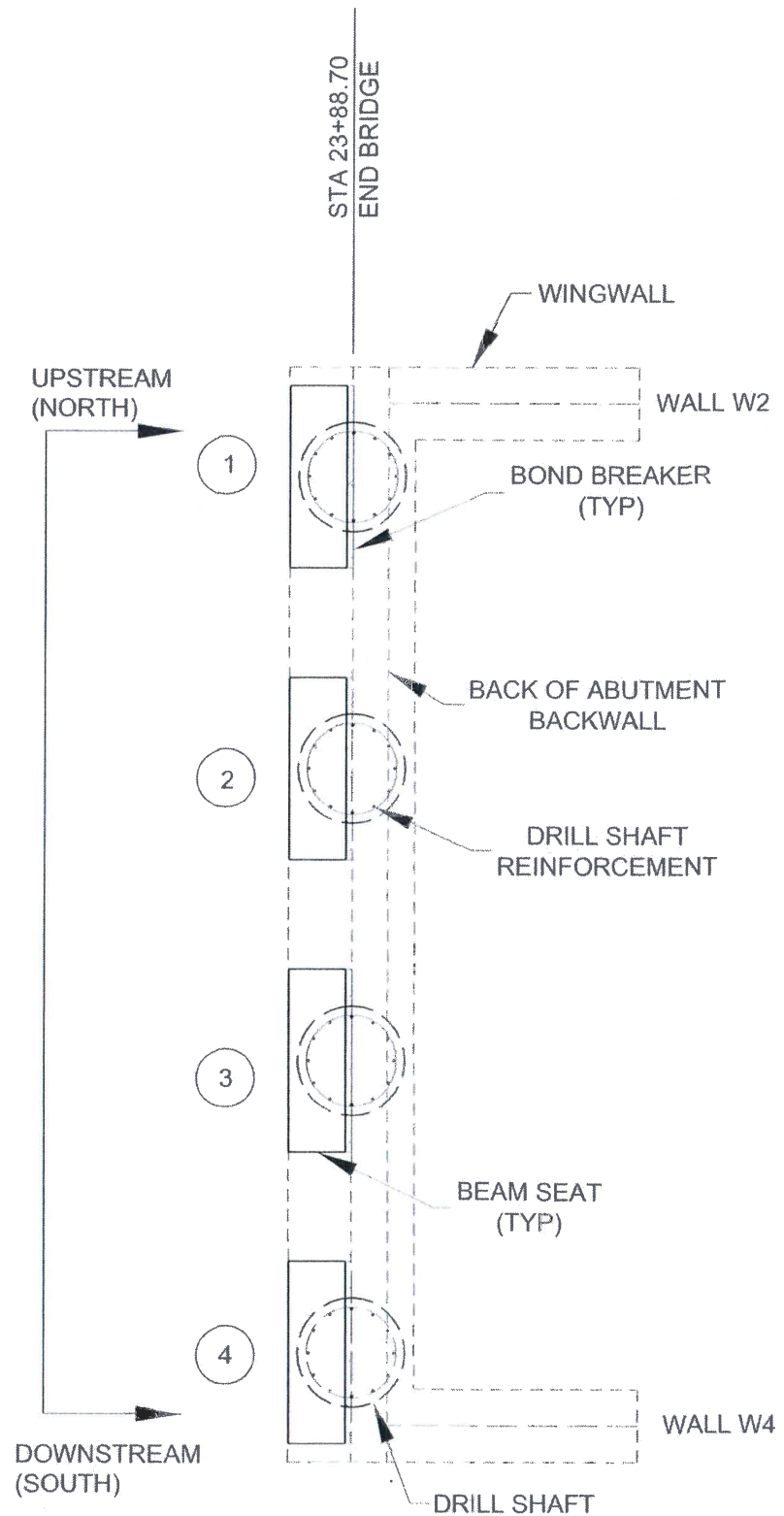
FIELD MOD
(03-08-2017)

AS-BUILT CONDITION
(02-07-2017)

MI METROPOLITAN INFRASTRUCTURE, PLLC <small>10945 ESTATE LN, STE E225, DALLAS, TX, 75238 Tel # (214) 341-1501, Fax # (214) 341-1640 FIRM REGISTRATION No: 6939</small>					
BEARING SEAT ELEVATIONS BLONDY JHUNE ROAD WEST BRIDGE BLONDY JHUNE ROAD BRIDGES CITY OF LUCAS, TEXAS					
DESIGN	DRAWN	DATE	FILE	NUMBER	SHEET
LRF	PH/KW	MAR 8 2017			1/4

WEST BRIDGE EAST ABUTMENT

KEY		
MI DESIGN ELEVATION		560.00
AS-BUILT/SURVEY ELEVATION		(560.00)



Louis R. Frisbie
 STATE OF TEXAS
 LOUIS R. FRISBIE
 69355
 LICENSED
 PROFESSIONAL ENGINEER
 MARCH 8, 2017

FIELD MOD
(03-08-2017)

AS-BUILT CONDITION
(02-07-2017)

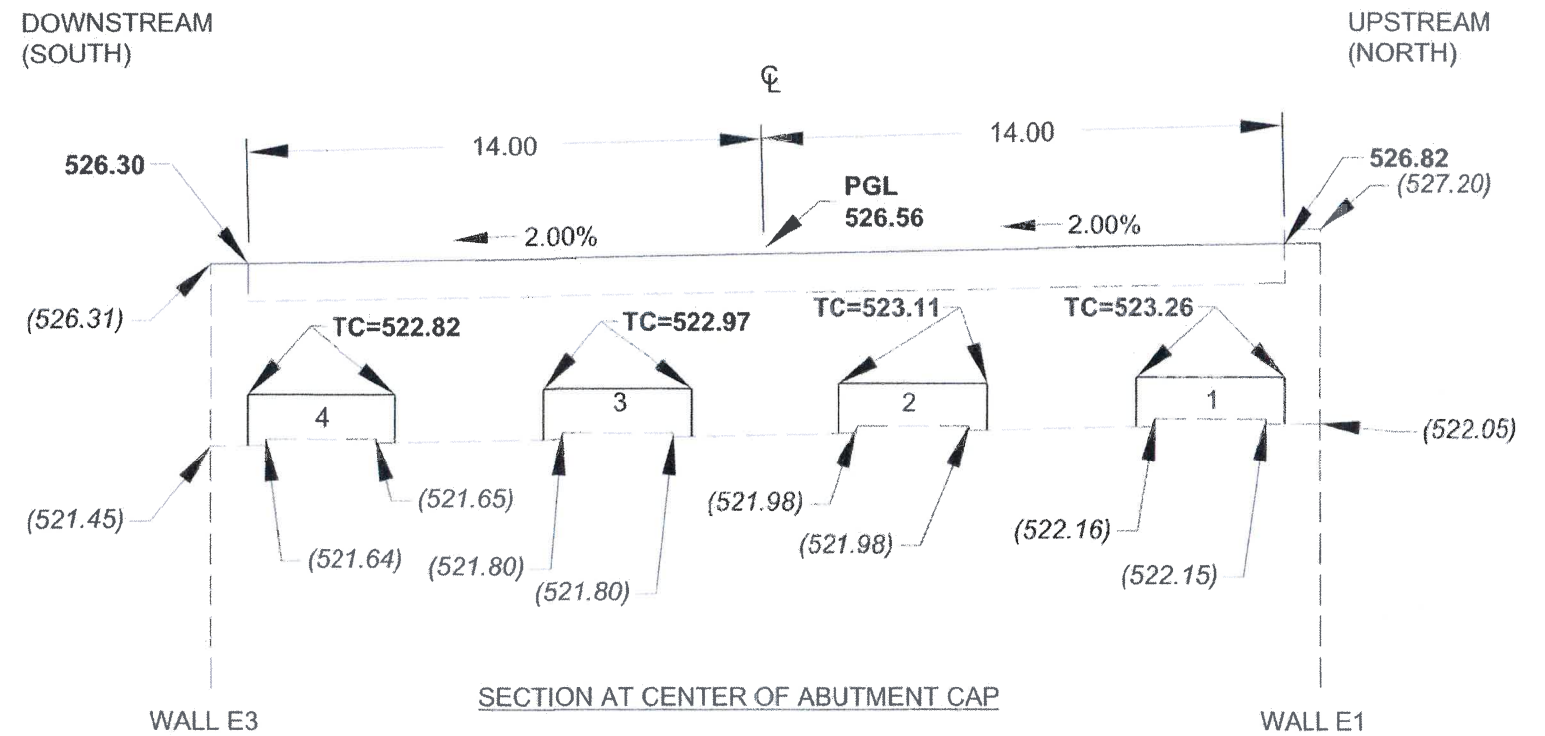
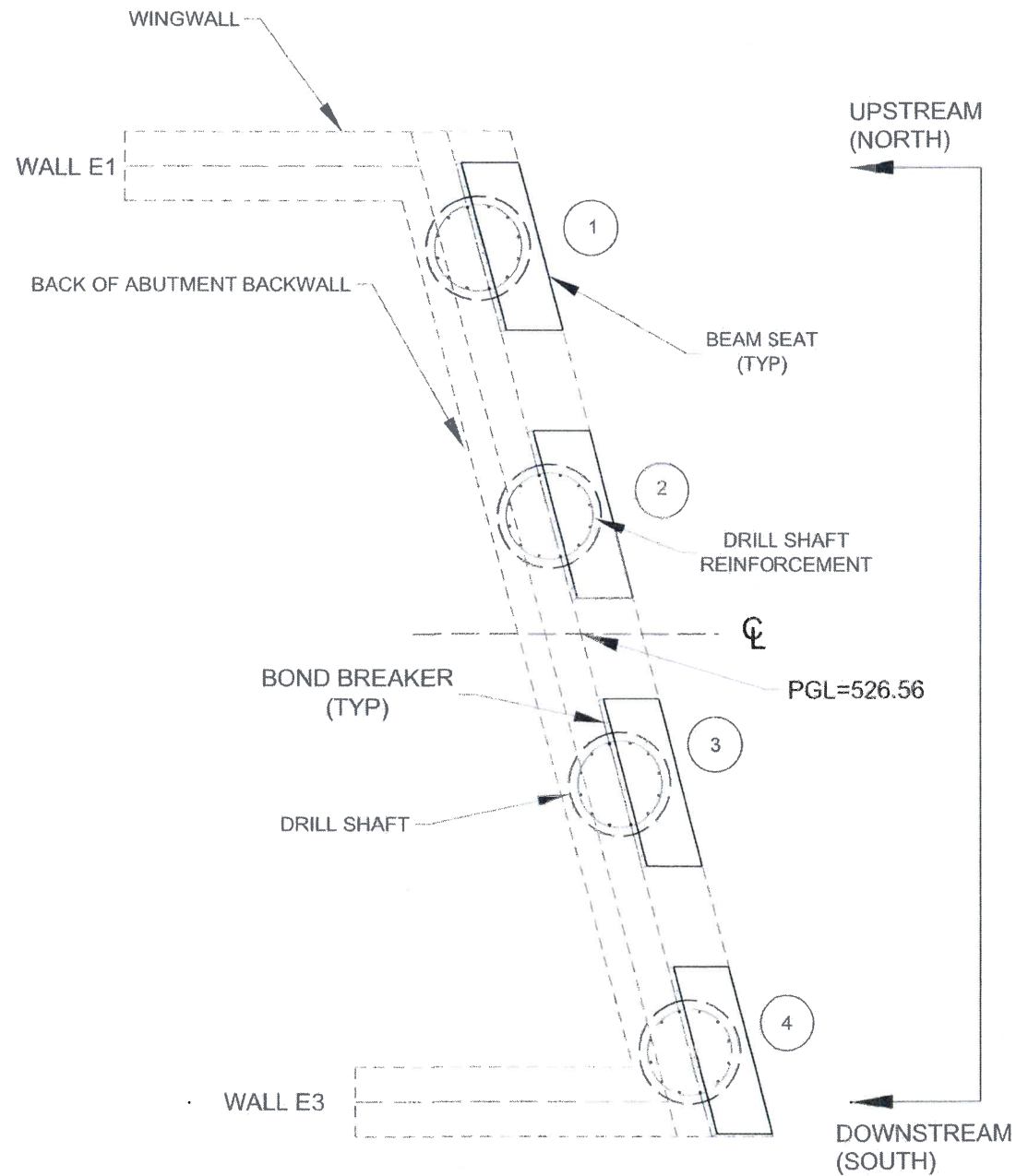
MI METROPOLITAN INFRASTRUCTURE, PLLC
 10045 ESTATE LN, STE E225, DALLAS, TX, 75238
 Tel # (214) 341-1501, Fax # (214) 341-1940
 FIRM REGISTRATION No. 6939

BEARING SEAT ELEVATIONS
 BLONDY JHUNE ROAD
 WEST BRIDGE
 BLONDY JHUNE ROAD BRIDGES
 CITY OF LUCAS, TEXAS

DESIGN	DRAWN	DATE	FILE	NUMBER	SHEET
URF	PH/KW	MAR 8 2017			2/4

EAST BRIDGE WEST ABUTMENT

KEY		
MI DESIGN ELEVATION		560.00
AS-BUILT/SURVEY ELEVATION*		(560.00)



Louis R. Frisbie
 STATE OF TEXAS
 LOUIS R. FRISBIE
 69355
 LICENSED PROFESSIONAL ENGINEER
 MARCH 8, 2017

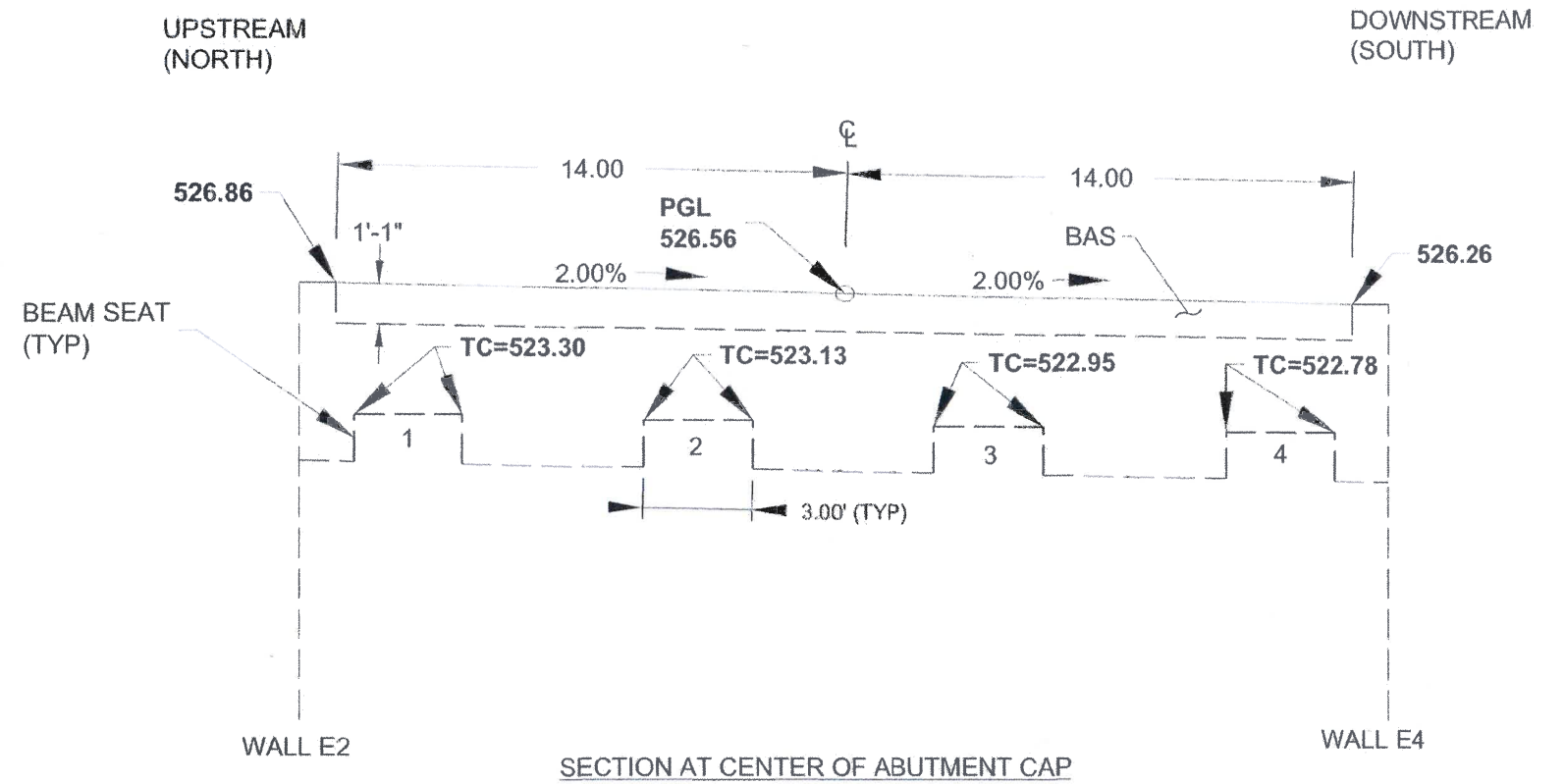
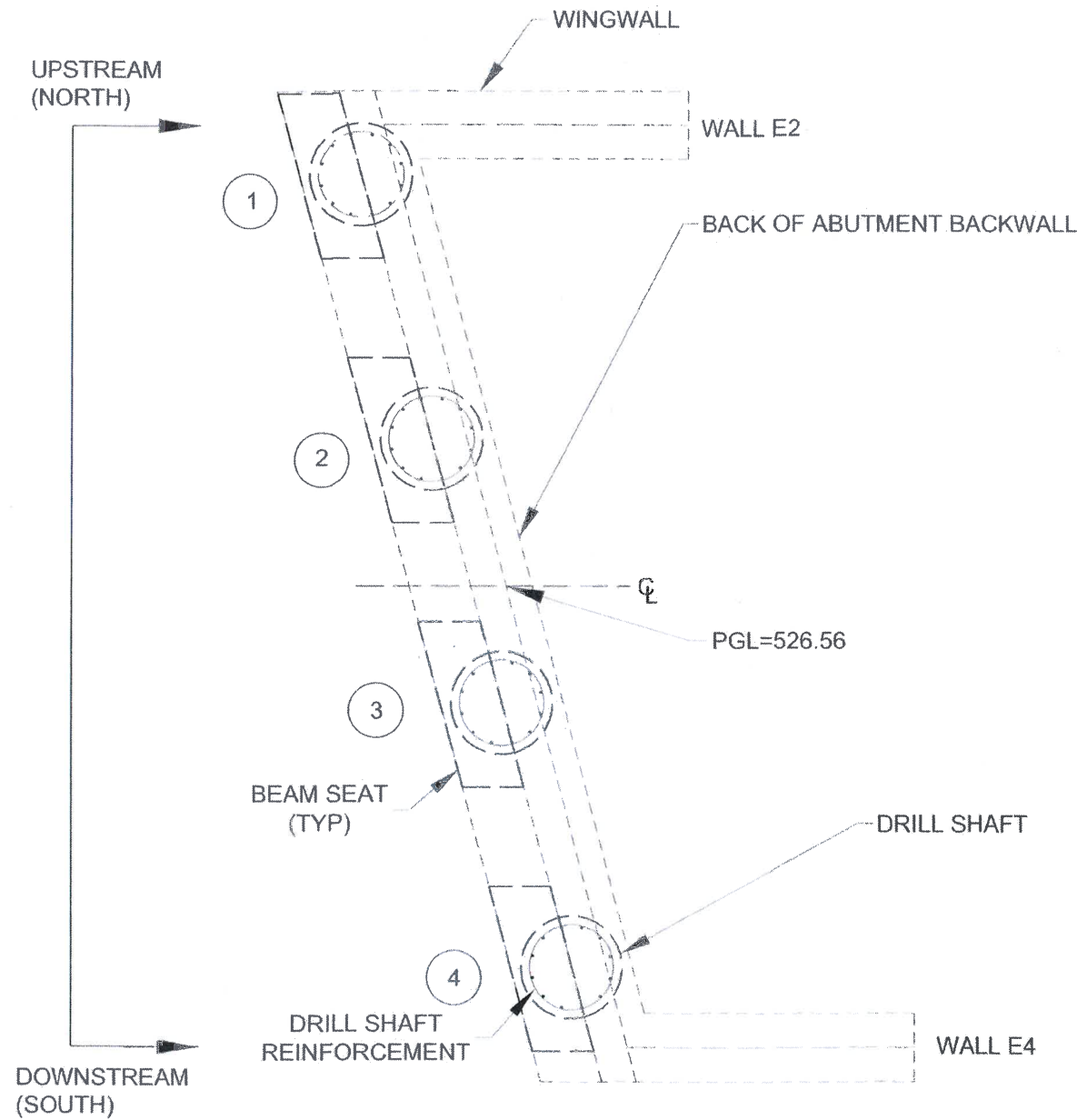
FIELD MOD
 (03-08-2017)
 AS-BUILT CONDITION
 (02-07-2017)

MI METROPOLITAN INFRASTRUCTURE, PLLC <small>10945 ESTATE LN, STE E225, DALLAS, TX, 75238 Tel # (214) 341-1601, Fax # (214) 341-1640 FIRM REGISTRATION No: 6039</small>					
BEARING SEAT ELEVATIONS					
BLONDY JHUNE ROAD					
EAST BRIDGE					
BLONDY JHUNE ROAD BRIDGES					
CITY OF LUCAS, TEXAS					
DESIGN	DRAWN	DATE	FILE	NUMBER	SHEET
LRF	PH/KW	MAR 8 2017			3/4

EAST BRIDGE EAST ABUTMENT

KEY		
MI DESIGN ELEVATION		560.00
AS-BUILT/SURVEY ELEVATION		(560.00)

*AS-BUILT ELEVATIONS NOT AVAILABLE AT THIS TIME



Handwritten signature

 Louis R. Frisbie
 69355
 LICENSED PROFESSIONAL ENGINEER
 March 8, 2017

FIELD MOD
(03-08-2017)

MI METROPOLITAN INFRASTRUCTURE, PLLC <small>10945 ESTATE LN, STE E226, DALLAS, TX, 75238 TEL # (214) 341-1501, FAX # (214) 341-1540 FIRM REGISTRATION No: 6839</small>					
BEARING SEAT ELEVATIONS BLONDY JHUNE ROAD EAST BRIDGE BLONDY JHUNE ROAD BRIDGES CITY OF LUCAS, TEXAS					
DESIGN	DRAWN	DATE	FILE	NUMBER	SHEET
LPF	PH/KW	MAR 8 2017			4/4