GENERAL NOTES

1. FOR EXPANSION BEARINGS, THE HORIZONTAL Δ DUE TO POSITIVE AND NEGATIVE MOVEMENT CAUSED BY ANTICIPATED TOTAL TEMPERATURE CHANGE SHALL NOT EXCEED THE SMALLER OF 0.5T OR 0.5 TIMES THE BEARING THICKNESS. BEARINGS SHALL BE DESIGNED ACCORDING TO METHOD A AS DESCRIBED IN THE LATEST VERSION OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

2. TOTAL COMPRESSIVE DEFLECTION OF BEARING IS THE SUM OF THE LAYER DEFLECTIONS.

3. AT SERVICE LIMIT STATE, THE AVERAGE COMPRESSIVE STRESS ON ELASTOMERIC BEARING SHALL NOT EXCEED 800 P.S.I. FOR PLAIN PADS AND 1250 P.S.I. FOR STEEL REINFORCED BEARINGS, UNDER A COMBINATION OF DEAD LOAD PLUS LIVE LOAD, NOT INCLUDING IMPACT.

4. THE AVERAGE COMPRESSIVE STRESS DUE TO DEAD LOAD ONLY, SHALL NOT EXCEED 500 P.S.I.

5. WHEN DEAD LOAD PLUS LIVE LOAD UPLIFT REDUCE THE AVERAGE PRESSURE TO LESS THAN 200 P.S.I., THE BEARING SHALL BE SECURED AGAINST HORIZONTAL CRAWLING, PREFERABLY BY POSITIVE ATTACHMENT TO THE TOP SURFACE OR TO THE TOP AND BOTTOM SURFACES.

6. THE COMPRESSIVE DEFLECTION UNDER INSTANTANEOUS LIVE LOAD AND INITIAL DEAD LOAD OF A PLAIN ELASTOMERIC PAD OR AN INTERNAL LAYER OF A STEEL-REINFORCED ELASTOMERIC BEARING AT THE SERVICE LIMIT WITHOUT IMPACT SHALL NOT EXCEED 0.09 TIMES THE THICKNESS OF THE PLAIN ELASTOMERIC PAD OR 0.09 TIMES THE THICKNESS OF AN INTERNAL LAYER OF A STEEL REINFORCED ELASTOMERIC BEARING.

7. THESE LIMITS SHALL BE OBSERVED IN LAMINATED BEARINGS:
   MINIMUM L = 3T; MINIMUM W = 3T; MINIMUM R = 2T
   L = LENGTH OF A RECTANGULAR BEARING PARALLEL TO THE LONGITUDINAL AXIS OF THE BRIDGE.
   W = WIDTH OF RECTANGULAR BEARING PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE BRIDGE.
   T = TOTAL EFFECTIVE ELASTOMER THICKNESS (SUMMATION OF t'S AND t1'S).
   T = TOTAL THICKNESS (SUMMATION OF T AND STEEL LAMINATES).
   t = THICKNESS OF ONE ELASTOMER LAYER.
   R = RADIUS OF A CIRCULAR BEARING.

8. ELASTOMERIC BEARINGS SHALL CONFORM TO AASHTO M251 WITH THE ELASTOMER HAVING A DUROMETER HARDNESS BETWEEN 50 TO 70.
9. MATERIAL FOR BEARING SOLE PLATE TO BE THE SAME AS BRIDGE STEEL.

10. BEVEL TOP OF SOLE PLATE SURFACE TO MATCH GRADE IF GRADE EXCEEDS 1% AND THE PLATE THICKNESS AT CENTERLINE SHALL BE 1" MINIMUM.

11. THESE LIMITS SHALL BE OBSERVED IN PLAIN BEARINGS:
    MINIMUM L = 5T; MINIMUM W = 5T; MINIMUM R = 3T

12. BEARINGS MAY HAVE EXTERNAL STEEL PLATES BONDED TO THE UPPER OR LOWER ELASTOMER LAYERS OR BOTH. SUCH LOAD PLATES SHALL BE AT LEAST AS LARGE AS THE ELASTOMER LAYER TO WHICH THEY ARE BONDED.

13. WHEN INTEGRALLY BONDED FABRIC-REINFORCEMENT (COTTON DUCK) IS USED, THE MINIMUM BONDED $\frac{1}{8}$" VERTICAL EDGES MAY BE ELIMINATED.

14. BEARINGS, RESTRAINTS, AND ANCHORAGES SHALL BE DESIGNED AS A MINIMUM TO RESIST THE SEISMIC FORCES SPECIFIED IN THE LATEST AASHTO LRFD BRIDGE DESIGN SPECIFICATION.

ISSUED: 8/2015	
REVISION	APPROVAL

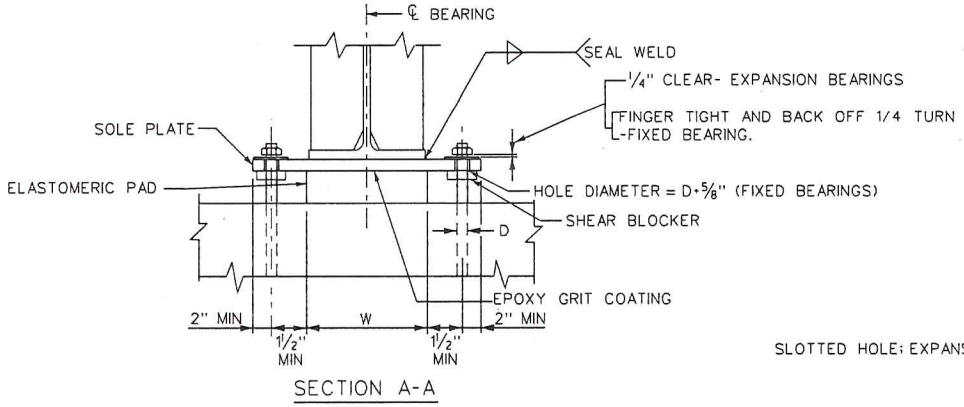
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

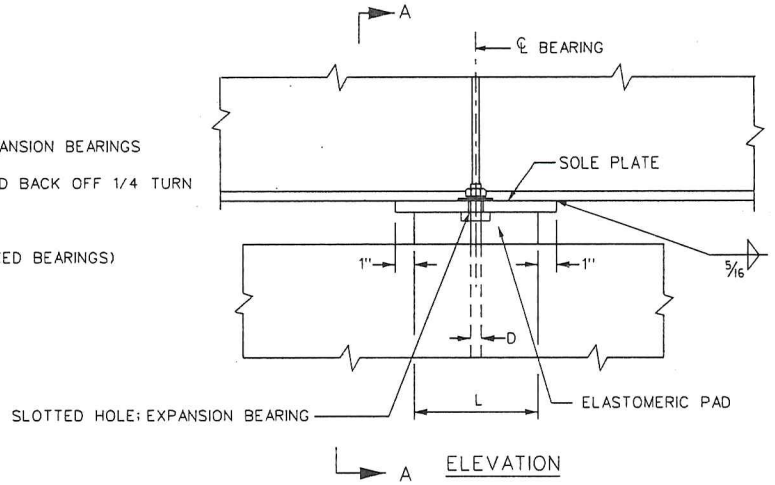
GENERAL NOTES FOR ELASTOMERIC BEARINGS

d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.01



SECTION A-A

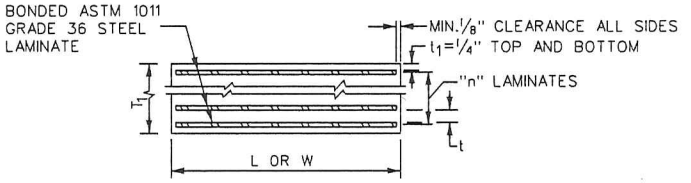


ELEVATION

SLOTS IN SOLE PLATE: (EXPANSION BEARING),
WIDTH = D+5/8"
LENGTH = 4 1/2" MIN.

TYPE	SPAN'	REACTION NO IMPACT	WIDTH	LENGTH	THICKNESS	LAMINATES		EFFECTIVE THICKNESS	HORIZONTAL	TOTAL	D"	COMPRESSIVE DEFLECTION (△c")	
		R K	W"	L"	t"	NO	THICKNESS	T"	△"	T_1"		INTERIOR LAYER	COVER LAYER

FOR EACH BRIDGE DESIGN, PLEASE FILL THIS TABLE AND SHOW THICKNESS OF LAMINATE ON THE ELASTOMERIC PAD DRAWING.



ELASTOMERIC PAD

EFFECTIVE THICKNESS T = SUMMATION OF t & t_1

TOTAL THICKNESS T_1 = T + (n) x (LAMINATE THICKNESS)

NOTE:

DESIGNER SHALL FILL THE TABLE.

ISSUED: 8/2015	
REVISION	APPROVAL

RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

ELASTOMERIC BEARINGS

d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.02

GENERAL NOTES:

A. PROVIDE MATERIALS AND WORKMANSHIP CONFORMING TO CURRENT AASHTO, LRFD BRIDGE DESIGN SPEC. AND AASHTO/AWS-D1.5M/D1.5 BRIDGE WELDING CODE.

B. PLACE ALL INTERMEDIATE STIFFENERS ON OPPOSITE SIDE OF WEB FROM LONGITUDINAL STIFFENER WHEN POSSIBLE. [LONGITUDINAL STIFFENERS CAN BE USED ONLY WITH THE APPROVAL OF BRIDGE DESIGN ENGINEER]

C. WHEN BEARING STIFFENER IS USED AS A CONNECTION PLATE, WELD TO TOP AND BOTTOM FLANGE.

D. MEMBER, WELD AND PLATE SIZES SHOWN ARE VALID FOR STRAIGHT GIRDERS WITH MAXIMUM GIRDER SPACING OF 10'-0" AND FOR SKEW ANGLES BETWEEN 0° AND 20°. PROVIDE SPECIAL DESIGNS FOR ALL THE DIAPHRAGM MEMBER, WELD AND PLATE SIZE WHEN THE GIRDER SPACING EXCEEDS 10'-0", GIRDER DEPTH EXCEEDS 7'-0" AND/OR THE SKEW ANGLE EXCEEDS 20 DEGREES.

E. THE DIAPHRAGM DETAILS SHOWN ARE VALID FOR SKEW ANGLES 0° TO 20° AND DIAPHRAGM DETAIL FOR SKEWED SUPPORTS AT ABUTMENT AND INTERMEDIATE SUPPORT.

F. FILLET WELD SIZES ARE GOVERNED BY MATERIAL THICKNESS IN ACCORDANCE WITH AASHTO/AWS-D1.5M/D1.5.

G. PROVIDE INTERMEDIATE DIAPHRAGM DETAILS NORMAL TO THE GIRDER/BEAM FOR SKEWS GREATER THAN 20 DEGREES.

H. THE DIAPHRAGMS SHOWN DO NOT INCLUDE WIND LOAD TRANSFERRED TO THE BEARINGS THROUGH CONNECTIONS.

I. ON EXTERIOR GIRDERS PLACE ALL INTERMEDIATE STIFFENERS ON INSIDE OF GIRDER.

THE FOLLOWING NOTES ARE TO BE USED WHEN REFERENCED ON THE DRAWINGS.

1. UNDER FULL DEAD LOAD, BEAM ENDS AND ALL BEARING STIFFENERS, INCLUDING BEARING STIFFENERS AT PIERS, ARE VERTICAL TO WITHIN APPLICABLE AASHTO/AWS FABRICATION AND CONSTRUCTION TOLERANCES.

2. PERFORM NON-DESTRUCTIVE TESTING ON LONGITUDINAL STIFFENER BUTT WELDS PRIOR TO ATTACHMENT TO GIRDER WEB.

3. SEE DWG NO. 706.11 FOR WEB CONNECTION PLATE INSTALLATION DETAILS.

4. $1\frac{1}{16}$" DIAMETER HOLE IN CONNECTION PLATE; $1\frac{5}{16}$" DIAMETER HOLE IN CONNECTING MEMBER, FOR $\frac{7}{8}$" DIA. ASTM DESIGNATION A325 BOLTS.

5. USE $\frac{7}{8}$" DIAMETER ASTM DESIGNATION A325 BOLTS HAVING AN UNTHREADED SHANK OF SUFFICIENT LENGTH TO NOT ALLOW ANY THREADS WITHIN THE PLANE BETWEEN THE TWO CONNECTED PARTS (SHEAR PLANE)

6. $1\frac{1}{16}$" DIAMETER HOLE IN BEARING STIFFENERS; $1\frac{5}{16}$" DIAMETER HOLE IN CONNECTION PLATE FOR $\frac{7}{8}$" DIAMETER ASTM DESIGNATION A325 BOLTS. NOTE 5 DOES NOT APPLY.

7. "K" - FLANGE THICKNESS + FILLET, AS INDICATED IN AISC TABLES OF BEAM DIMENSIONS.

8. POSITION DIAPHRAGM CONNECTION COMPONENTS SO AS TO CREATE MINIMUM OFFSET FROM CL BEARINGS, DIAPHRAGM CONNECTION PLATE MAY BE PLACED BEHIND THE BEARING STIFFENER TO MINIMIZE OFFSET.

9. PROVIDE CONNECTION PLATE ON THE OUTSIDE FACE ALSO FOR TWO OR THREE GIRDER SYSTEMS.

10. PROVIDE WELDING AS SHOWN IN "DETAIL-C" (DWG. NO. 706.06). THIS DETAIL IS TYPICAL FOR ALL WELDED CONNECTIONS.

11. CHECK ANCHOR BOLT CLEARANCES WHEN STIFFENERS ARE WIDER THAN FLANGE.

ISSUED: 8/2015	
REVISION	APPROVAL

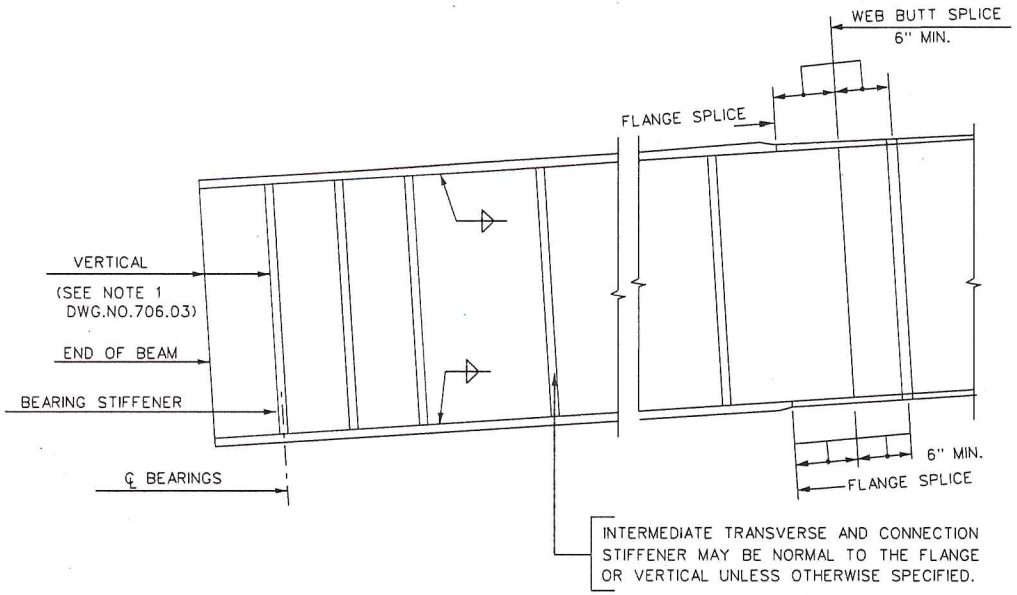
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

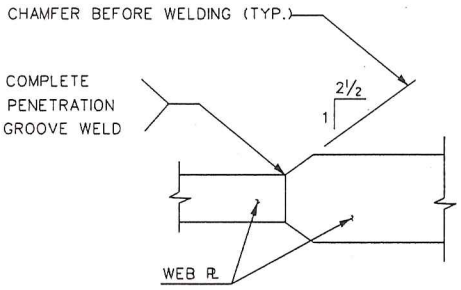
GENERAL NOTES FOR STEEL CONNECTIONS

d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION

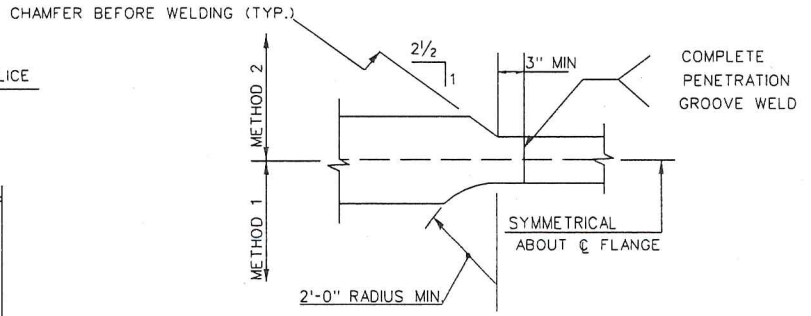
DWG. NO. 706.03



TYPICAL GIRDER DETAIL

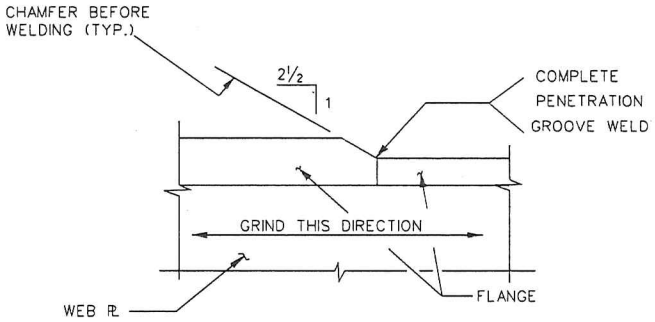


WEB THICKNESS TRANSITION



PLAN

FLANGE WIDTH TRANSITION



ELEVATION

FLANGE SPLICE DETAILS

NOTES:

A. STIFFENER SIZE MUST BE SHOWN ON PLANS.

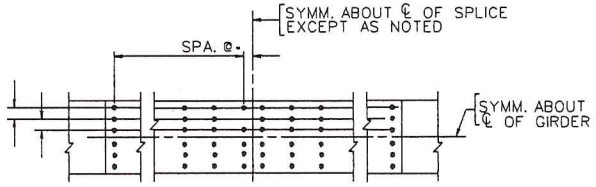
B. FILLET WELD SIZE SHALL BE SHOWN ON PLANS UNLESS MINIMUM WELD SIZE AS PER AASHTO/AWS D1.5M/D1.5 IS TO BE USED.

C. SEE DRAWING NO. 706.11 FOR ADDITIONAL DETAIL OF STIFFENERS.

D. MINIMUM DIMENSION BETWEEN FLANGE SPLICE AND WEB SPLICE RECOMMENDED BY AISC IS 6".

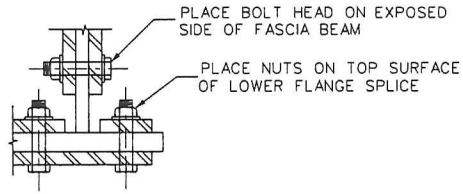
E. MINIMUM DISTANCE BETWEEN WEB THICKNESS TRANSITION AND FLANGE THICKNESS TRANSITIONS SHALL BE 2'-0".

ISSUED: 8/2015	RECOMMENDED: PROJECT MANAGER	GIRDER WELDED SPLICE DETAILS	d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION
REVISION / APPROVAL	APPROVED: Muhammad Khalid CHIEF ENGINEER		DWG. NO. 706.04

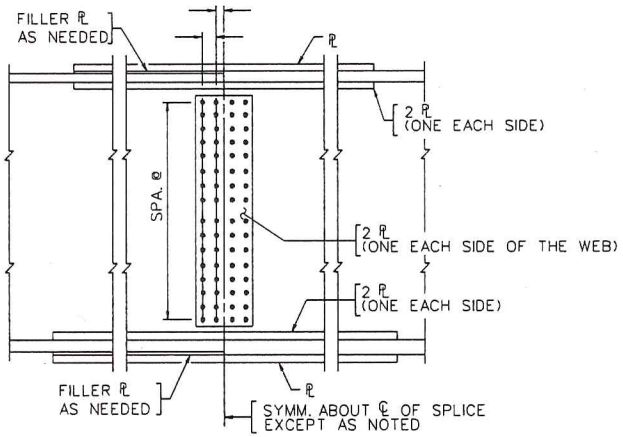


TOP FLANGE

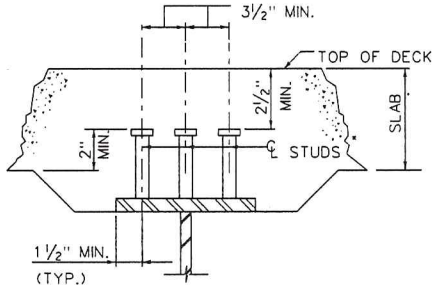
UNIFORM BOLT PATTERN SHOWN



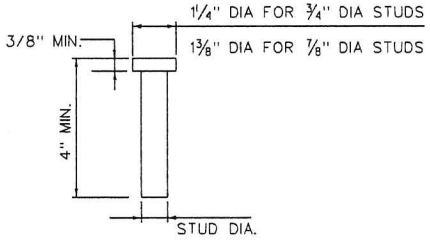
BOLTED SPLICE DETAIL



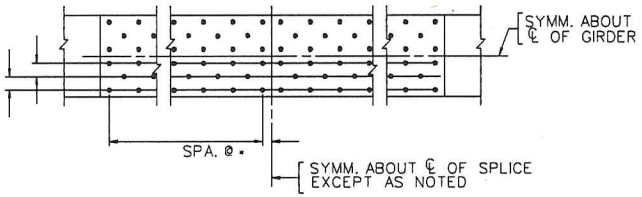
WEB



SHEAR CONNECTOR DETAILS



STUD DETAIL



BOTTOM FLANGE

STAGGERED BOLT PATTERN SHOWN

BOLTED SPLICE DETAILS

NOTES:

A. STUD SHEAR CONNECTORS ON TOP FLANGE NOT SHOWN. FOR SPACING, SEE GIRDER DETAILS, DWG. NO. 706.11.

B. IF CONTRACTOR INCREASES THE GIRDER WEB THICKNESS IN ORDER TO ELIMINATE THE TRANSVERSE STIFFENERS, NO CHANGE WILL BE MADE IN THE WEB SPLICE.

C. ALL SPLICE PLATES SHALL BE THE SAME GRADE STEEL AS THE GIRDERS.

D. SIZE FOR FLANGE PLATES AND STRESSES WILL DETERMINE WHETHER UNIFORM OR STAGGERED BOLT PATTERN IS REQUIRED.

E. REFER DWG. NO. 703.05 FOR BRIDGE DECK DETAILS.

F. DESIGNER TO SHOW ALL EDGE DISTANCE FOR BOLTED SPLICE.

G. NUMBER OF BOLTS REQUIRED FOR THE SPLICES SHALL BE BASED ON THE DESIGN.

ISSUED: 8/2015	
REVISION	APPROVAL

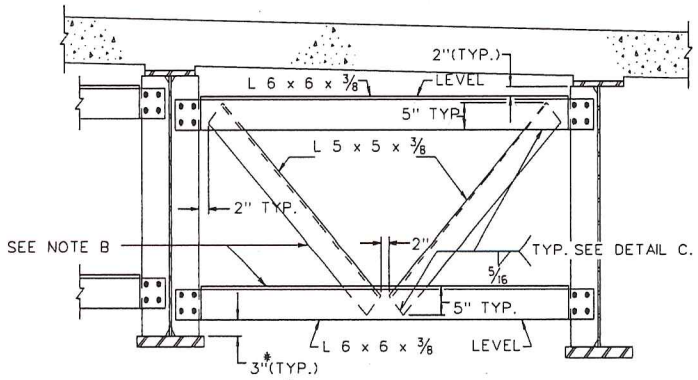
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

SHEAR CONNECTOR AND BOLTED SPLICE DETAILS

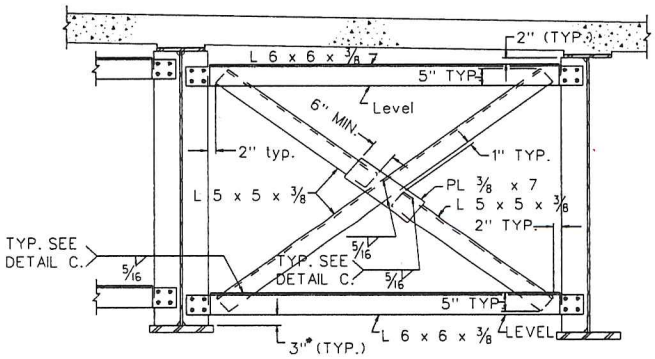
d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.05



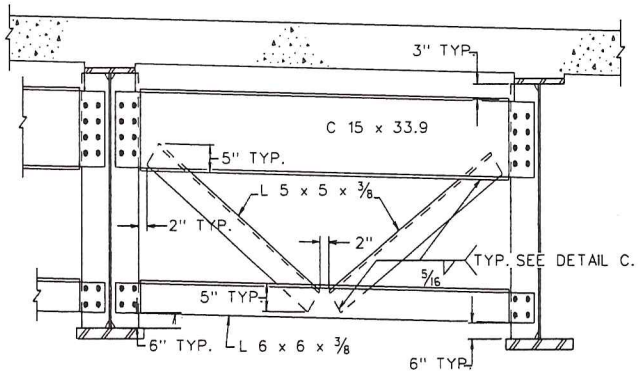
*DIMENSION SHALL BE 6" AT PIERS

V TYPE-INTERMEDIATE DIAPHRAGM



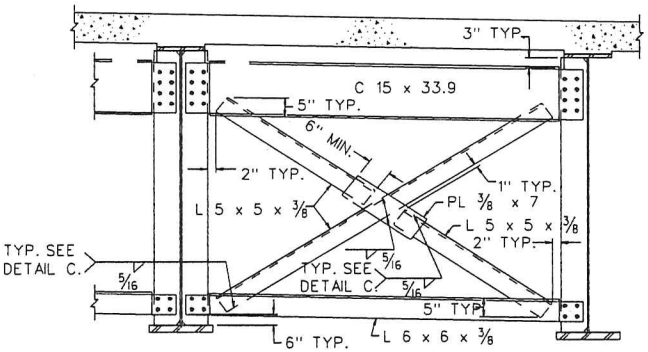
• DIMENSION SHALL BE 6" AT PIERS

X TYPE-INTERMEDIATE DIAPHRAGM



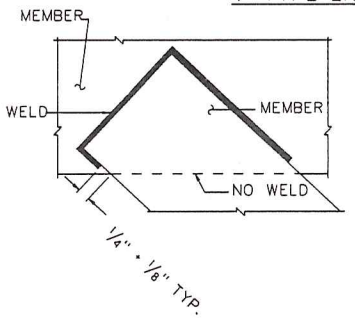
REFER TO DETAIL- F & DETAIL- G IN DWG. NO. 706.07 FOR ALTERNATE END DIAPHRAGM DETAIL.

V TYPE-END DIAPHRAGM

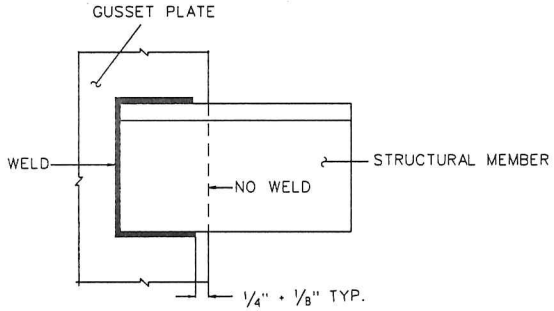


REFER TO DETAIL- F & DETAIL- G IN DWG. NO. 706.07 FOR ALTERNATE END DIAPHRAGM DETAIL.

X TYPE-END DIAPHRAGM



DETAIL C



NOTES:

A. FOR DIAPHRAGM PERPENDICULAR TO GIRDER, THERE IS NO NEED OF COPING OUTSTANDING FLANGE.

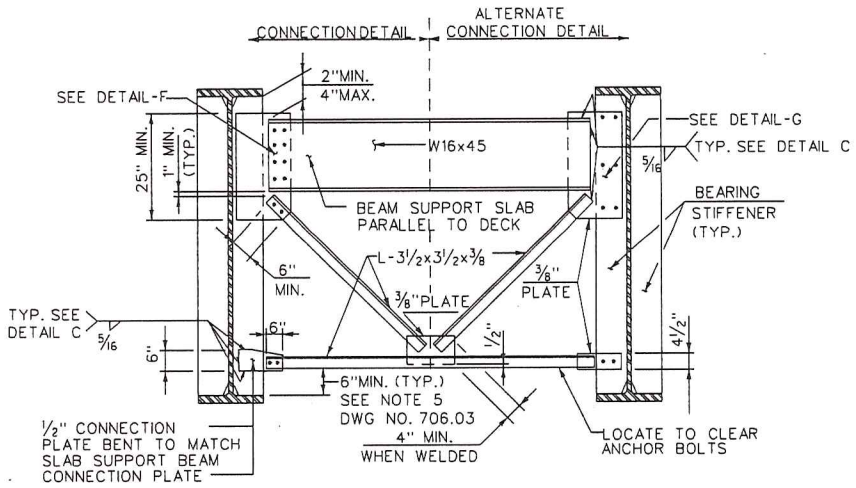
B. USE V TYPE DIAPHRAGM UP TO A MAXIMUM ANGLE OF 60°.

C. FOR ADDITIONAL NOTES AND DETAILS, REFER TO DWG. NO. 706.07 & 706.08.

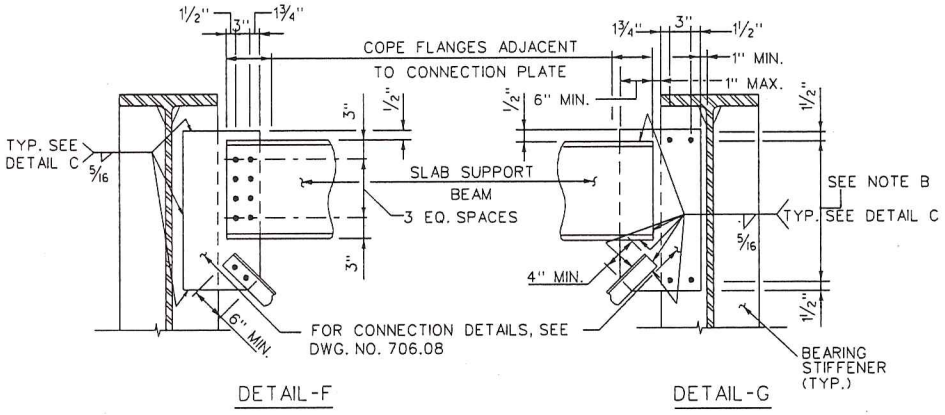
D. AVOID MIXING V-TYPE AND X-TYPE DIAPHRAGM THROUGHOUT THE BRIDGE.

E. DIAPHRAGM DETAILS SHOWN FOR SKEW 0 DEG. TO 20 DEG.; SKEW GREATER THAN 20 DEG. WILL HAVE SIMILAR DETAIL, BUT WILL HAVE GUSSET PLATE CONNECTION DETAILS AS SHOWN ON DWG. NO. 706.08.

ISSUED: 8/2015	RECOMMENDED: PROJECT MANAGER	DIAPHRAGM DETAILS	d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION
REVISION / APPROVAL	APPROVED: Muhammed Khalid CHIEF ENGINEER		DWG. NO. 706.06



ALTERNATE END DIAPHRAGM DETAIL

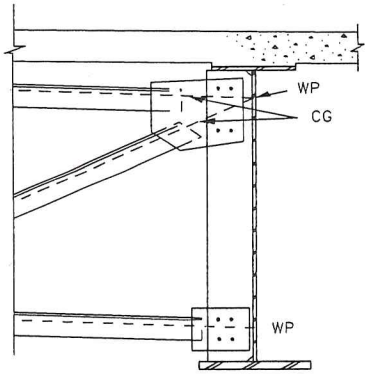


DETAIL-F DETAIL-G

NOTE:

A. SEE DWG. NO. 706.06 FOR ADDITIONAL INFORMATION.

B. IT IS DESIGNER'S RESPONSIBILITY TO DESIGN THE CROSS FRAMES INCLUDING LOCATION AND MEMBER SIZES, WELD LENGTHS, LOCATION AND GEOMETRY OF BOLT GROUPS, NO. OF BOLTS AND SIZE OF BOLTS, GUSSET PLATE SIZES, CONNECTION PLATE SIZES. (FOR CONDITIONS NOT COVERED UNDER NOTE D ON DWG. NO. 706.03)



CURVED GIRDER CROSS FRAME CONNECTION

NOTE FOR CURVED GIRDER CONNECTION:

A. CROSS FRAME MEMBERS IN HORIZONTALLY CURVED GIRDER BRIDGES ARE PRIMARY MEMBERS.

B. IT IS DESIGNER'S RESPONSIBILITY TO DESIGN THE CROSS FRAMES INCLUDING LOCATION AND MEMBER SIZES, WELD LENGTHS, LOCATION AND GEOMETRY OF BOLT GROUPS, NO. OF BOLTS AND SIZE OF BOLTS, GUSSET PLATE SIZES, CONNECTION PLATE SIZES. WHAT IS SHOWN HERE IS THE MINIMUM

C. THE CENTERS OF GRAVITY AXIS (C.G.) OF INTERSECTING CROSS FRAME MEMBERS SHALL INTERSECT AT THE CENTERLINE OF WEB. THE C.G. OF THE CHORD ON EITHER SIDE OF ONE GIRDER SHALL INTERSECT AT A POINT ON THE CENTERLINE OF WEB OR THE GIRDER SHALL BE DESIGNED TO CARRY THE MOMENT AT THAT LOCATION.

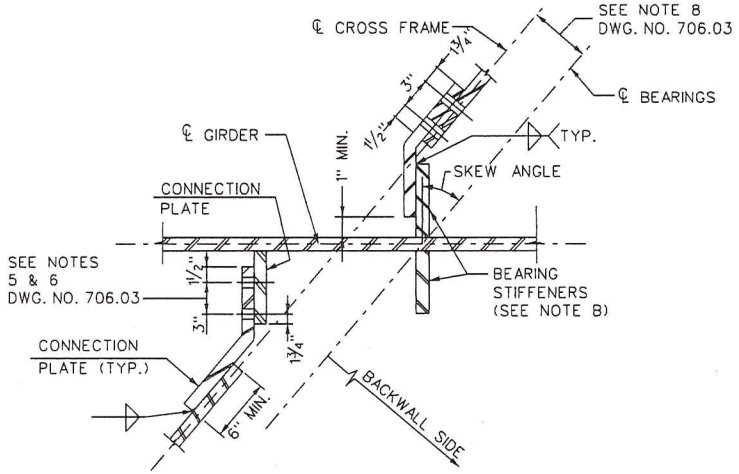
D. CROSS FRAMES SHALL BE CONNECTED TO THE CONNECTION PLATES USING GUSSET PLATES. NO MEMBERS OF THE CROSS FRAMES SHOULD BE DIRECTLY CONNECTED TO THE GIRDER.

E. THE ENDS OF ANGLES SHALL BE WELDED OR BOLTED TO GUSSET PLATES.

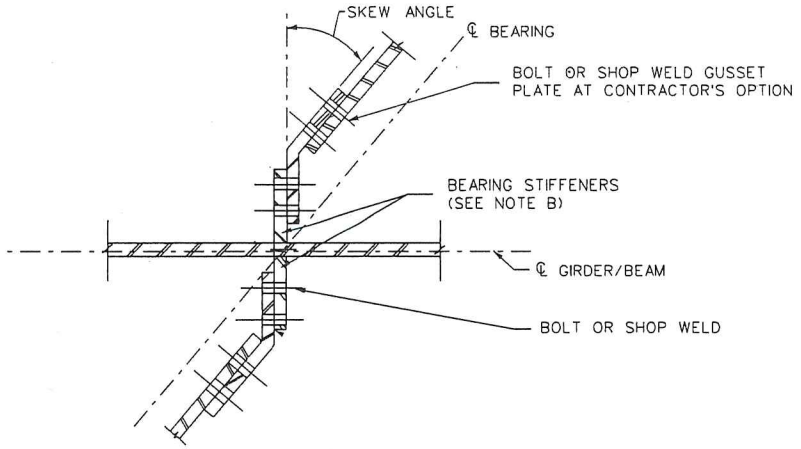
F. FOR INTERIOR BEAMS/GIRDERS, THE CONNECTION PLATES SHALL BE PLACED IN PAIRS EVEN WHEN THERE IS NO CORRESPONDING CROSS FRAME.

G. ALL CONNECTION PLATES SHALL BE WELDED TO BOTH FLANGES AND WEB OF GIRDER.

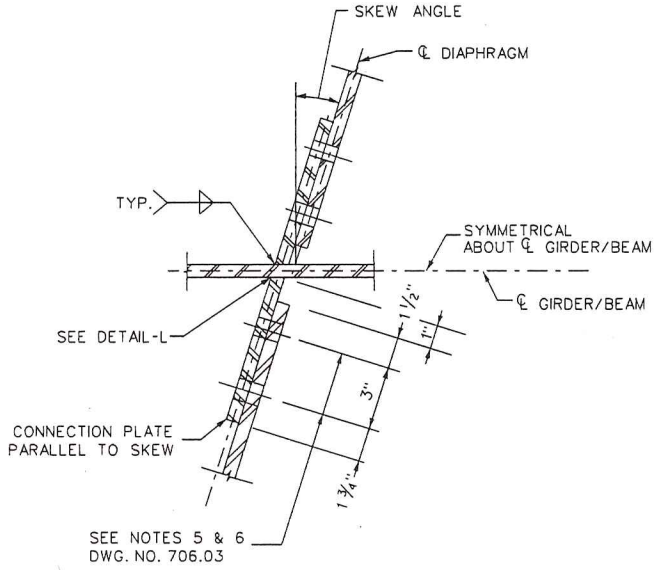
ISSUED: 8/2015	RECOMMENDED: PROJECT MANAGER	ALTERNATE END DIAPHRAGM CONNECTION DETAILS AND CURVED GIRDER CONNECTION DETAIL (SAMPLE)	d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION
REVISION | APPROVAL	APPROVED: Mohammed Khalid CHIEF ENGINEER		DWG. NO. 706.07



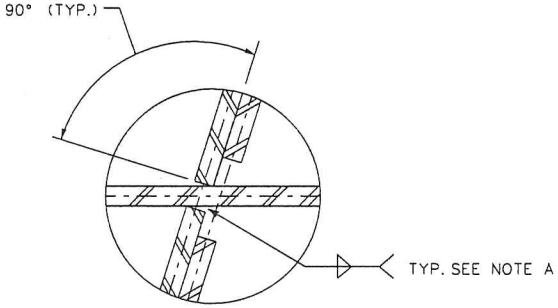
DIAPHRAGM CONNECTION FOR SKEW GREATER THAN 20° AT ABUTMENT



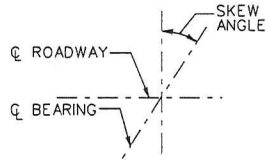
DIAPHRAGM CONNECTION AT SKEWED INTERIOR SUPPORT LINES
(FOR CONTINUOUS SPANS)



INTERMEDIATE DIAPHRAGM CONNECTION FOR SKEW 0° TO 20°



DETAIL-L



SKEW ANGLE
ORIENTATION

NOTES:

A. WELD SIZE MUST BE INCREASED BY AMOUNT OF GAP BETWEEN CONNECTION PL AND WEB WHEN GAP EXCEEDS 1/16" INDICATE SIZE ON SHOP DRAWINGS.

B. BEARING STIFFENER IS ALWAYS PERPENDICULAR TO THE GIRDER FOR ANY SKEW.

C. THE DETAIL SHOWN HERE DO NOT INCLUDE CURVED GIRDERS. SEE DWG. NO. 706.07 FOR GIRDER DETAIL AND NOTES.

ISSUED: 8/2015	
REVISION	APPROVAL

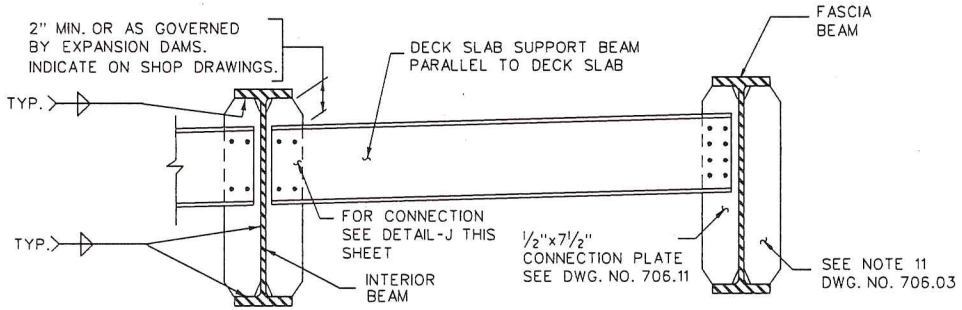
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

DIAPHRAGM CONNECTION PLATE DETAILS

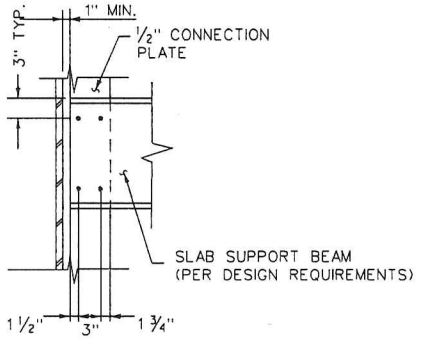
d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.08



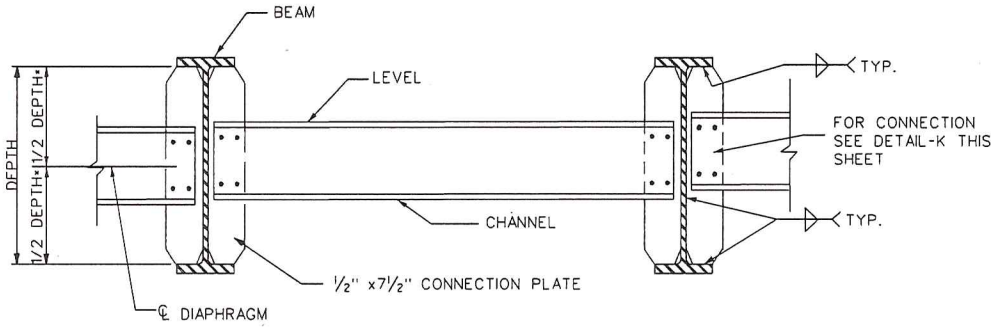
END DIAPHRAGM

FOR ROLLED SECTIONS



DETAIL-J

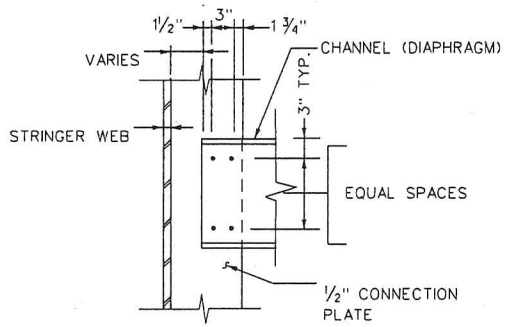
END DIAPHRAGM
(SEE NOTE 6
DWG. NO. 706.03)



* - WHEREVER POSSIBLE

INTERMEDIATE DIAPHRAGM

FOR ROLLED SECTIONS



DETAIL-K

INTERMEDIATE DIAPHRAGM
(SEE NOTE 4, DWG NO. 706.03)

NOTE:

A. IT IS DESIGNER'S RESPONSIBILITY TO DESIGN THE CROSS FRAMES INCLUDING LOCATION AND MEMBER SIZES, WELD LENGTHS, LOCATION AND GEOMETRY OF BOLT GROUPS, NO. OF BOLTS AND SIZE OF BOLTS.

B. THESE DETAILS MAY BE USED FOR PLATE GIRDERS AND ROLLED BEAMS WITH A MAXIMUN DEPTH OF 36".

ISSUED: 8/2015	
REVISION	APPROVAL

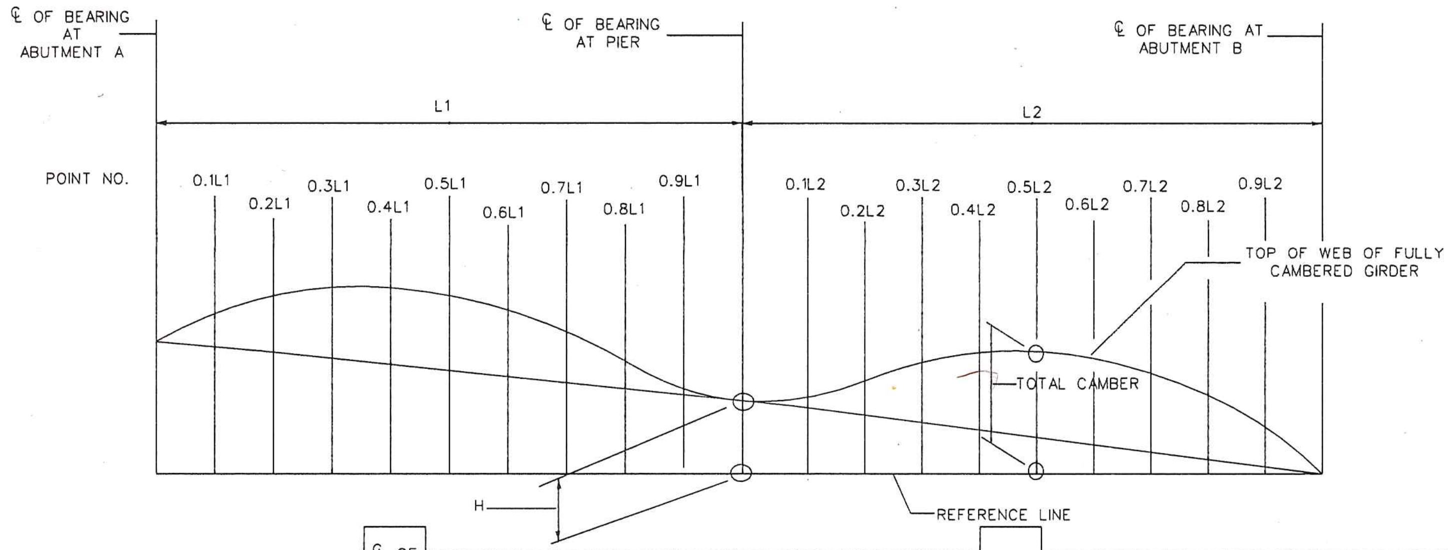
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

ROLLED BEAM DIAPHRAGM DETAILS

d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.09



NOTES:

A. FOR SPANS UNDER 65 ft., SHOW CAMBER AT QUARTER POINTS. FOR SPANS 65 TO 200 ft. IN LENGTH, SHOW THE VALUES ON THE TABLES AT TENTH POINTS (AS SHOWN). FOR SPANS OVER 200 ft., SHOW THE VALUES AT A MAXIMUM 20 ft. SPACING.

B. 2-SPAN SHOWN. DIAGRAM AND TABLES FOR OTHER SPAN ARRANGEMENTS TO BE LAID OUT SIMILARLY.

C. H IS DISTANCE BETWEEN HORIZONTAL REFERENCE LINE AND DEFLECTED TOP OF WEB AT ANY POINT BEING CONSIDERED.

CAMBER TABLE		℄ OF BRGS. ABUT. A	0.1L1	0.2L1	0.3L1	0.4L1	0.5L1	0.6L1	0.7L1	0.8L1	0.9L1	℄ OF BRGS. PIER	0.1L2	0.2L2	0.3L2	0.4L2	0.5L2	0.6L2	0.7L2	0.8L2	0.9L2	℄ OF BRGS. ABUT. B
GIRDER #	I STEEL D.L.																					
	II CONCRETE D.L.																					
	III SUPERIMPOSED D.L.																					
	IV H																					
	TOTAL - I+II+III+IV																					
GIRDER #	I STEEL D.L.																					
	II CONCRETE D.L.																					
	III SUPERIMPOSED D.L.																					
	IV H																					
	TOTAL - I+II+III+IV																					
GIRDER #	I STEEL D.L.																					
	II CONCRETE D.L.																					
	III SUPERIMPOSED D.L.																					
	IV H																					
	TOTAL - I+II+III+IV																					

ISSUED: 8/2015

REVISION	APPROVAL

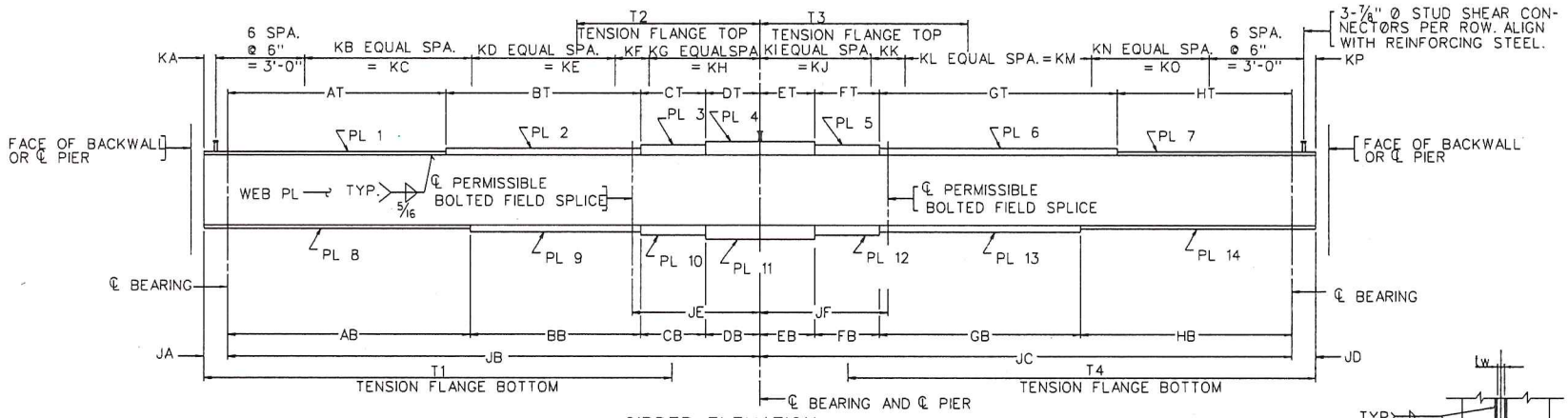
RECOMMENDED: [signature]
PROJECT MANAGER

APPROVED: Muhammed Khalid
CHIEF ENGINEER

CAMBER DIAGRAM AND TABLE (2-SPAN TYPICAL)

d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.10



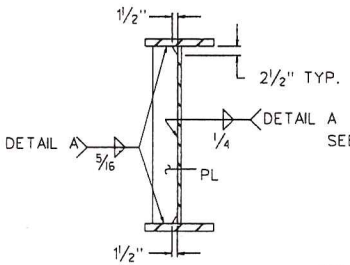
GIRDER ELEVATION

PLATE DIMENSION TABLE																
GIRDER	WEB PL	PL 1	PL 2	PL 3	PL 4	PL 5	PL 6	PL 7	PL 8	PL 9	PL 10	PL 11	PL 12	PL 13	PL 14	

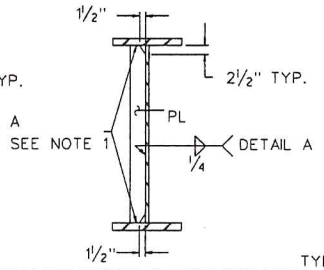
GIRDER DIMENSION TABLE																
GIRDER	AB	AT	BB	BT	CB	CT	DB	DT	EB	ET	FB	FT	GB	GT	HB	HT

GIRDER DIMENSION TABLE																					
GIRDER	JA	JB	JC	JD	JE	JF	KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP

TENSION FLANGES				
GIRDER	T1	T2	T3	T4

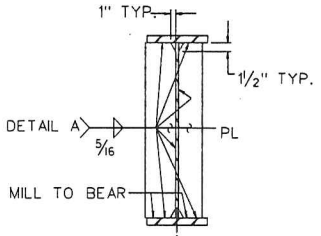


CROSS FRAME CONNECTOR PLATE



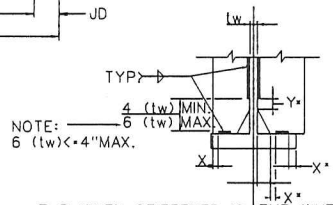
TRANSVERSE INTERMEDIATE STIFFENER

NOTE 1: FILLET WELD (BOTH SIDES) TO COMPRESSION FLANGE(S). TIGHT FIT TO TENSION FLANGE(S).



TYP. WHEN STIFFENER IS WIDER THAN FLNAGE | TYP. WHEN STIFFENER IS NARROWER THAN FLANGE

BEARING STIFFENERS



TYP. WHEN STIFFENER IS NARROWER THAN FLANGE | TYP. WHEN STIFFENER IS WIDER THAN FLNAGE

DETAIL A

DETAIL @ END OF STIFFENER OR CONNECTION PLATE

SHOW STIFFENER PLATE AND FILLET WELD SIZES ON THE PLAN

X = 1/4" ± 1/8"
Y = 1/2" ± 1/4"

NOTES:

A. THE CONTRACTOR HAS THE OPTION OF ELIMINATING THE INTERMEDIATE WEB STIFFENERS BY INCREASING THE WEB THICKNESS.

B. FOR SPACING OF INTERMEDIATE DIAPHRAGM CONNECTOR PL's AND INTERMEDIATE WEB STIFFENER PL's, SEE FRAMING PLAN, SHEET.

C. THE TOP AND BOTTOM FLANGE AS SHOWN IN GIRDER ELEVATION, THE WEB AND ALL SPLICE PLATES ARE AREAS OF TENSILE STRESS FOR CHARPY V-NOTCH IMPACT REQUIREMENT.

D. WHEN LONGITUDINAL STIFFENERS ARE REQUIRED, PLACE ALL TRANSVERSE STIFFENERS ON ONE SIDE OF WEB AND PLACE THE LONGITUDINAL STIFFENER ON OPPOSITE SIDE.

E. 2-SPAN GIRDER ELEVATION SHOWN, GIRDER ELEVATION AND DETAILS FOR OTHER SPAN ARRANGEMENTS TO BE SHOWN SIMILARLY.

SYMBOL Ø = DIAMETER

ISSUED: 8/2015	
REVISION	APPROVAL

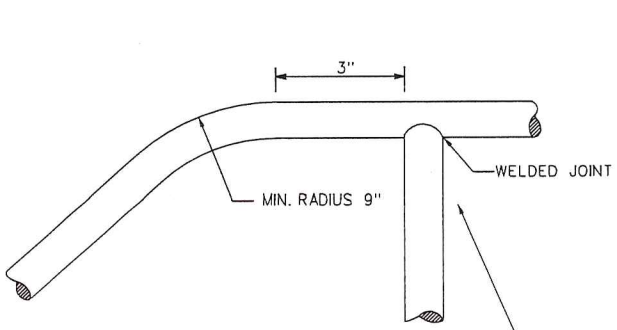
RECOMMENDED: _____ PROJECT MANAGER

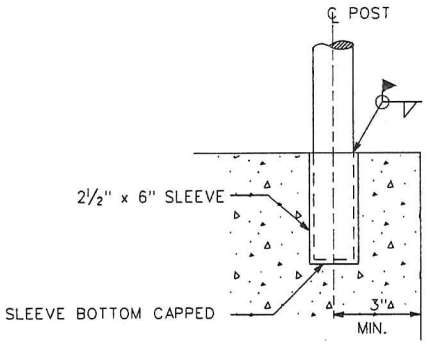
APPROVED: Mohammed Khalid CHIEF ENGINEER

GIRDER ELEVATION AND STIFFENER DETAILS (SAMPLE 2-SPAN)

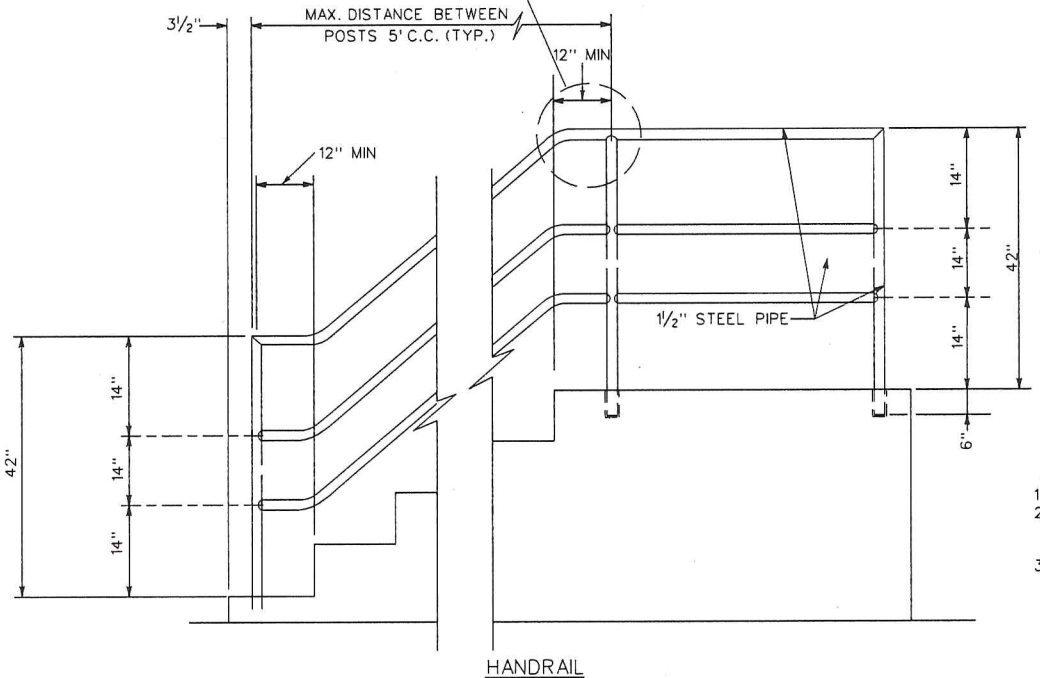
d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION

DWG. NO. 706.11

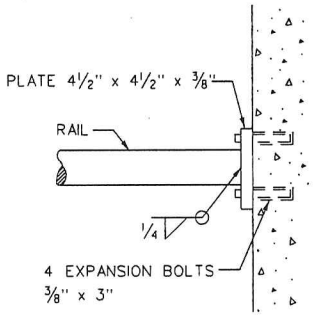




POST ANCHORAGE



HANDRAIL

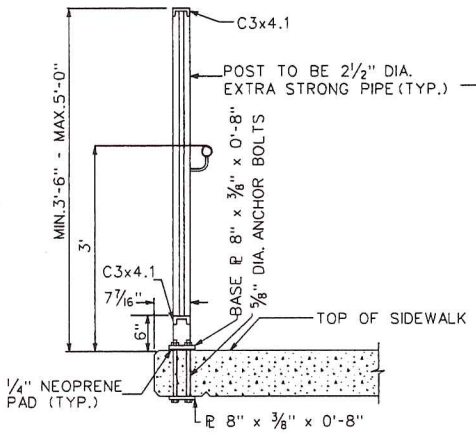


RAIL ANCHORAGE AT WALL

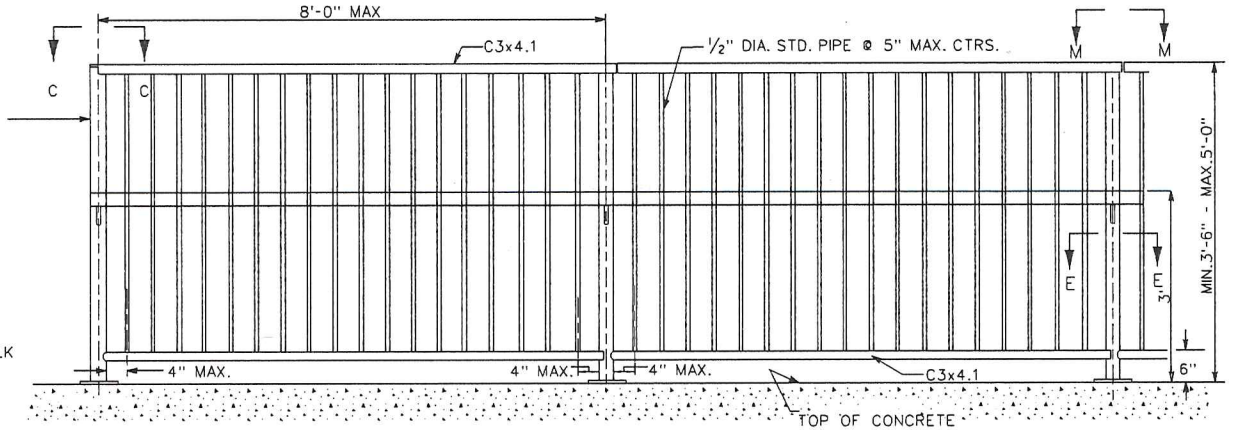
NOTES:
1. ALL PIPE SIZES ARE NOMINAL.
2. HANDRAILS CAN BE USED FOR STEPS AND OTHER APPLICATIONS SUCH AS ON THE TOP OF RETAINING WALLS, WALKWAYS.
3. DETAILS SHALL NOT TO BE USED ADJACENT TO VERTICAL DROPS MORE THAN 4 FT.

ISSUED: 8/2015	RECOMMENDED: Adil Rizvi PROJECT MANAGER	HAND RAIL	d. DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION
REVISION / APPROVAL	APPROVED: Muhammed Khalid CHIEF ENGINEER		DWG. NO. 709.01

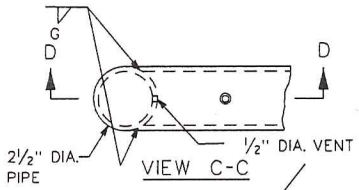
NOTE: THIS DRAWING IS INCLUDED FOR MAINTENANCE PURPOSES BUT NOT FOR USE ON NEW BRIDGES.



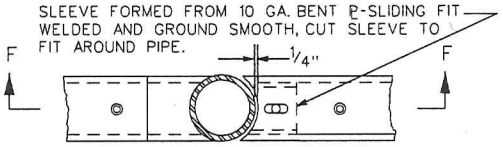
TYPICAL RAILING SECTION



TYPICAL RAILING ELEVATION

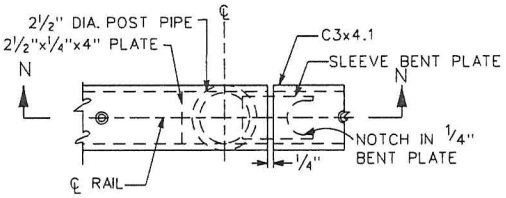


VIEW C-C

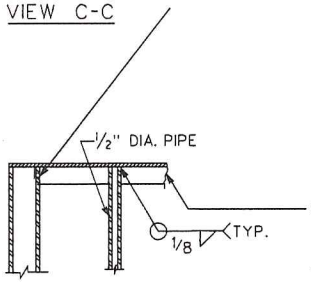


SECTION E-E

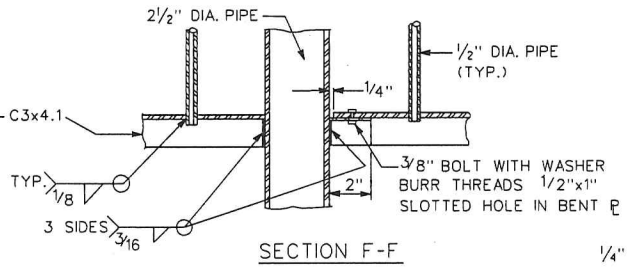
NOTE:
VIEW SHOWN WITHOUT HANDRAIL



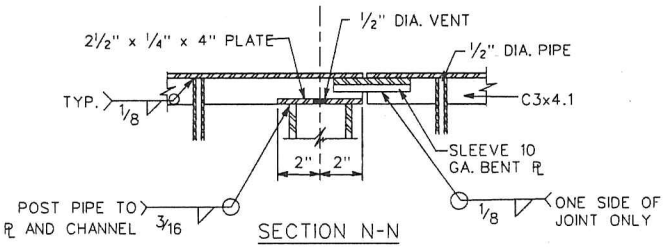
VIEW M-M



SECTION D-D



SECTION F-F



SECTION N-N

ISSUED: 8/2015	
REVISION	APPROVAL

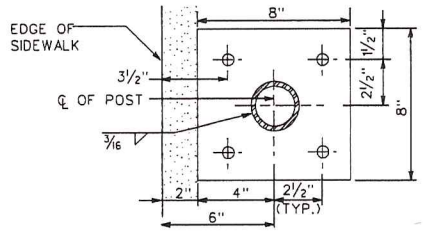
RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

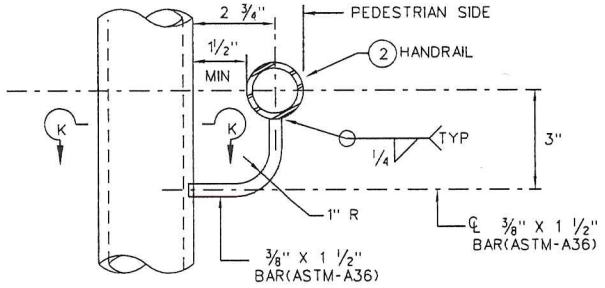
PEDESTRAIN RAILING DETAIL WITH HANDRAIL 1

d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

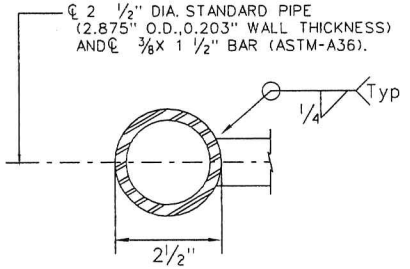
DWG. NO. 709.02



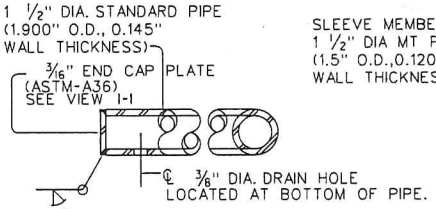
BASE PLATE DETAIL



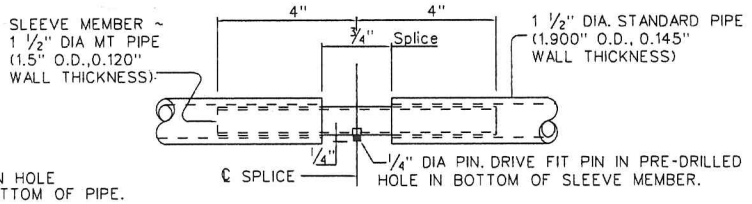
HAND RAIL ELEVATION



SECTION K-K



HANDRAIL END CAPS



AT SPLICE JOINTS

HANDRAIL FABRICATION DETAILS

NOTES:

1. ALL POSTS SHALL BE INSTALLED PERPENDICULAR TO THE SIDEWALK SLAB.
2. ALL RAILING COMPONENTS, INCLUDING ANCHORAGE SYSTEM, SHALL BE GALVANIZED AS PER AASHTO M111 AND M232 AS APPLICABLE.
3. PIPES SHALL BE FABRICATED AND THEN GALVANIZED ON THE OUTSIDE AND INSIDE.
4. 1 1/2" DIA. STANDARD PIPE (1.900" O.D., 0.145" WALL THICKNESS). PARALLEL TO RAMP / SIDEWALK. PROVIDE HOLES AS NEEDED IN 1 1/2" DIA. PIPE FOR GALVANIZING DRAINAGE AND VENTING.
5. SUBMIT SHOP DRAWINGS TO THE ENGINEER UNLESS OTHERWISE NOTED. FOR CURVED HANDRAIL APPLICATIONS, FABRICATE THE HANDRAIL TO THE CURVE IF RADIUS IS LESS THAN 600 FT. SHOP DRAWINGS ARE REQUIRED WHEN RAIL IS FABRICATED TO THE CURVES.
6. THE DETAILS OF HANDRAIL SHOWN IS OPTIONAL AND CAN BE USED WHEN THE HEIGHT OF RAILING EXCEEDS 3'.
7. IN THE CASE OF EXISTING STRUCTURES, THE CONTRACTOR MAY SET THE ANCHOR STUDS USING ⅞" DIA CORED HOLES AND AN APPROVED EPOXY GROUT. NUTS WASHERS AND PLATE SHALL BE OMMITED FROM THE EMBEDDED ENDS OF ANCHOR STUDS.
8. THE DETAILS INCLUDED HERE ARE FOR MAINTAINING EXISTING STRUCTURES AND IS ONLY APPLICABLE FOR FUTURE USE WITH APPROVAL FROM THE CHIEF ENGINEER.
9. ALL EXPOSED EDGES SHALL BE ROUNDED OR CHAMFERED TO APPROXIMATELY ⅛" BY GRINDING.

ISSUED: 8/2015	
REVISION	APPROVAL

RECOMMENDED: _____ PROJECT MANAGER

APPROVED: Muhammed Khalid CHIEF ENGINEER

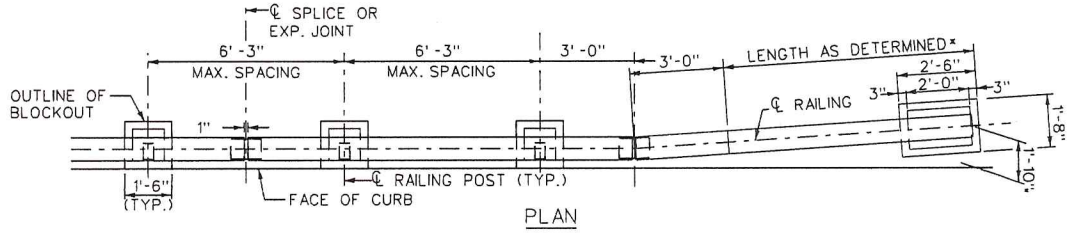
PEDESTRIAN RAILING DETAIL WITH HANDRAIL 2

d. DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

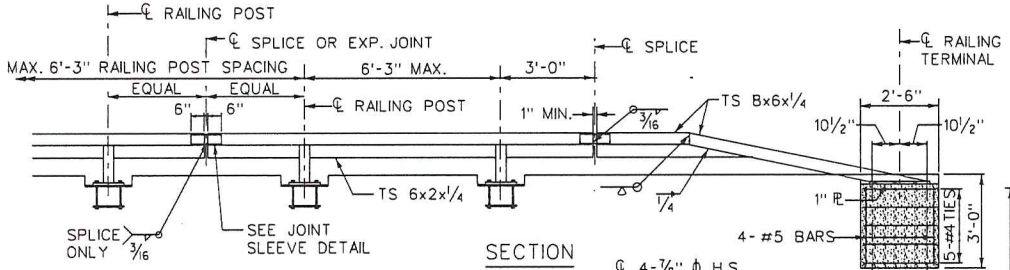
DWG. NO. 709.03

NOTES:

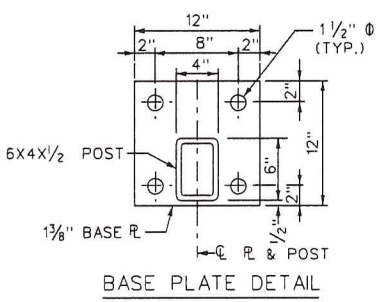
1. RAILING POST SHALL BE SET VERTICAL. RAILS SHALL FOLLOW THE GRADE OF THE ROADWAY.
2. RAILS SHALL BE CONTINUOUS OVER TWO OR MORE POSTS. EXPANSION SPLICES SHALL BE PLACED IN ANY PANEL WHERE EXPANSION JOINTS OCCUR.
3. ALL STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500, GRADE B.
4. ALL BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 325.
5. ALL STRUCTURAL SHAPES, PLATES AND BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 36 (ASTM A709 GRADE 36).
6. OFFSET DISTANCE AND LENGTH ARE BASED ON AASHTO ROADSIDE DESIGN GUIDE AND MAY BE ADJUSTED TO ALLOW FOR PLACEMENT OF GRANITE CURB.



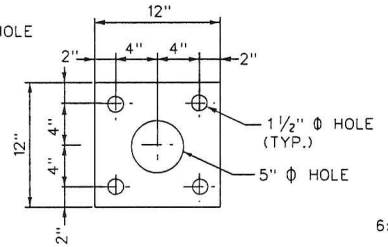
PLAN



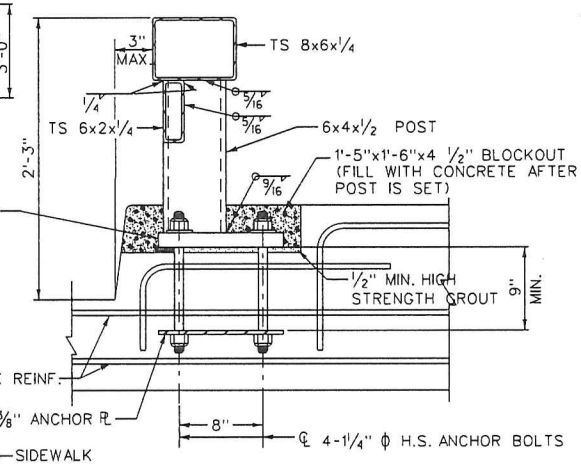
SECTION



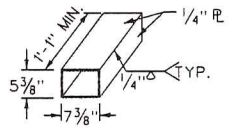
BASE PLATE DETAIL



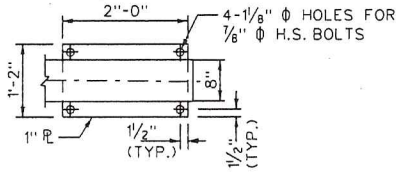
ANCHOR PLATE DETAIL



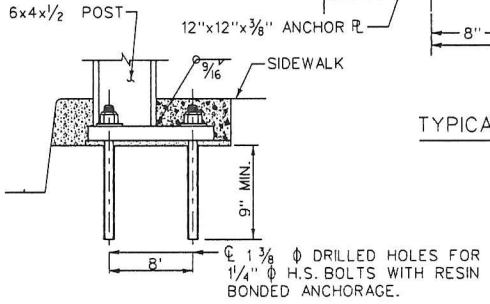
TYPICAL POST SECTION



JOINT SLEEVE DETAIL



TERMINAL ANCHORAGE



ALTERNATE ANCHORAGE

ISSUED: 8/2015	RECOMMENDED: PROJECT MANAGER
REVISION / APPROVAL	APPROVED: Muhammed Khalid CHIEF ENGINEER

HISTORIC BRIDGE RAIL

DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

DWG. NO. 709.04