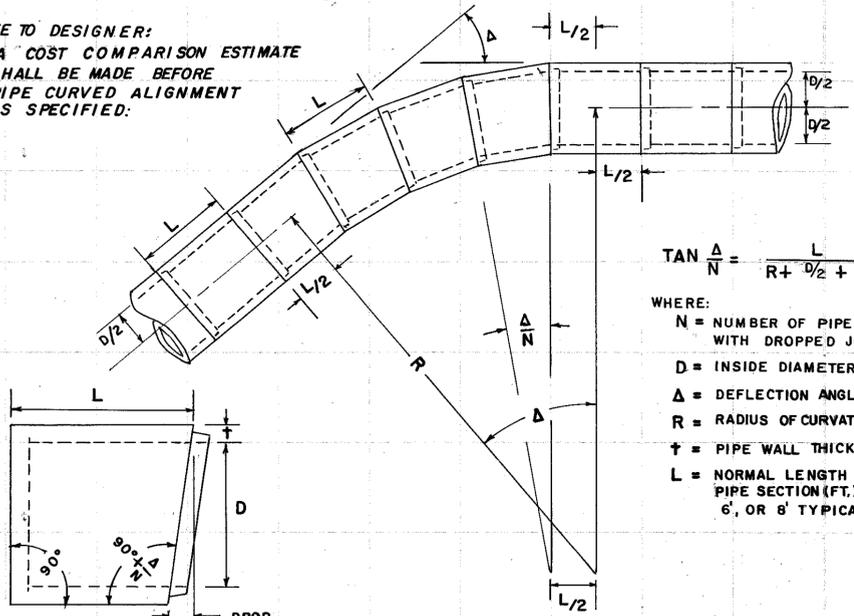


PIPE CURVED ALIGNMENT USING SECTIONS WITH DROPPED JOINTS

NOTE TO DESIGNER:
A COST COMPARISON ESTIMATE SHALL BE MADE BEFORE PIPE CURVED ALIGNMENT IS SPECIFIED.

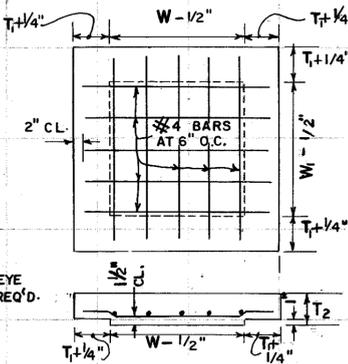


$$\tan \frac{\Delta}{N} = \frac{L}{R + \frac{D}{2} + t}$$

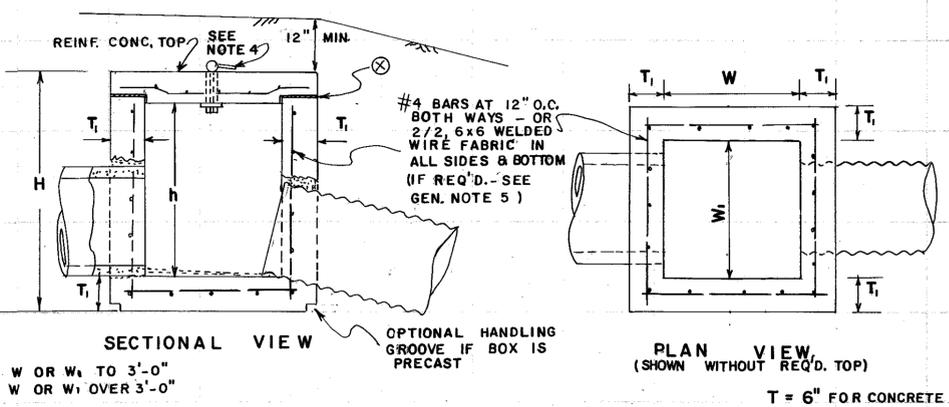
WHERE:
N = NUMBER OF PIPE SECTIONS WITH DROPPED JOINTS
D = INSIDE DIAMETER OF PIPE
Δ = DEFLECTION ANGLE, DEGREES
R = RADIUS OF CURVATURE (FT.)
t = PIPE WALL THICKNESS (FT.)
L = NORMAL LENGTH OF PIPE SECTION (FT.) 4', 6', OR 8' TYPICAL.

- NOTES FOR PIPE CURVED ALIGNMENT:**
- PLANS ARE TO SPECIFY ONLY THE PIPE DIAMETER "D", THE ANGLE "Δ", AND THE TANGENT ALIGNMENT.
 - PIPE WALL THICKNESS "t", PIPE SECTION LENGTHS "L", AND DROP IN PIPE JOINT "Δ/N" VARIES ACCORDING TO PIPE PRODUCER AND IS BASED ON FEASIBILITY.
 - THE RADIUS "R" AND THE NUMBER OF DROPPED JOINT PIPE SECTIONS "N" IS DETERMINED BY (1) & (2) ABOVE. MINOR MODIFICATIONS IN THE RADIUS "R" ARE NORMALLY MADE SO THAT "N" WILL BE A WHOLE NUMBER.
 - PIPE SECTIONS SHALL BE ORIENTED SUCH THAT THE PLANE OF THE DROPPED JOINT IS AT RIGHT ANGLES TO THE THEORETICAL CIRCULAR CURVE. THE TOP OF SECTIONS ARE TO BE MARKED SO THAT THE DEFLECTION ANGLE IS PROPERLY ORIENTED.
 - DETAILS ARE SHOWN FOR CONCRETE PIPE. CURVED ALIGNMENT FOR C.M. PIPE SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.
 - PAYMENT PER LIN. FT. PIPE INCLUDES PIPE SECTIONS WITH DROPPED JOINTS.

REINFORCED CONCRETE TOP



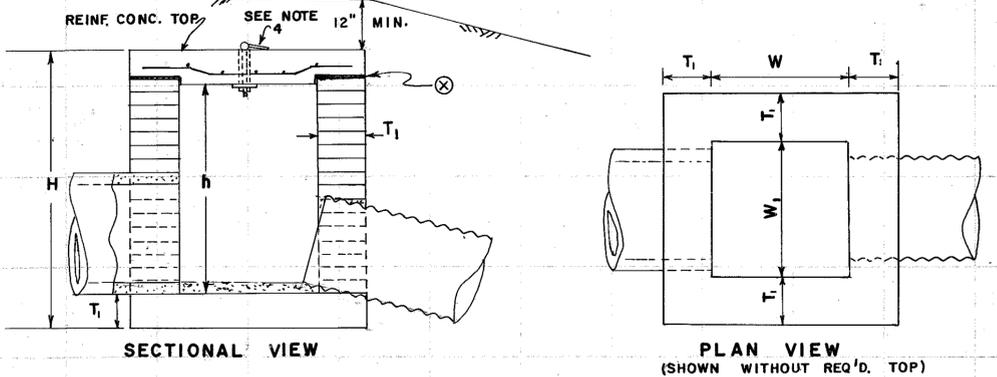
DETAILS OF CONCRETE JUNCTION BOX
(PRECAST OR BUILT IN PLACE)



T₂ = 5 1/2" FOR W OR W₁ TO 3'-0"
T₂ = 8" FOR W OR W₁ OVER 3'-0"

DETAILS OF BRICK JUNCTION BOX

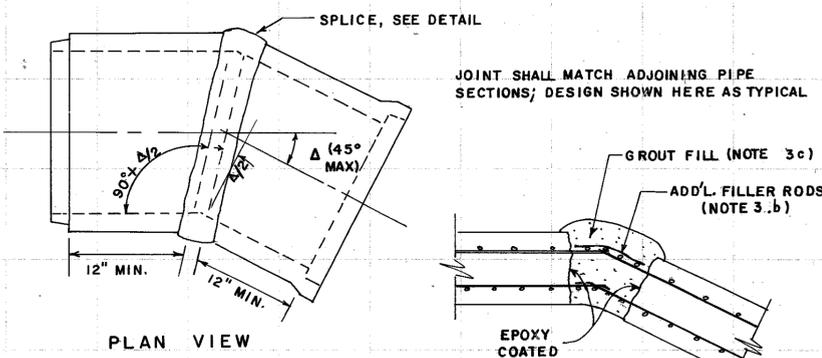
FOR BRICK T = 8" (MAX. 10 FT. DEPTH)



DIMENSIONS FOR BRICK OR REINF. CONC. BOX

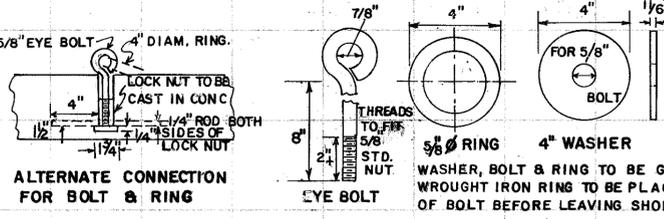
PIPE SIZE	W OR W ₁	MIN. h	MIN. H
15"	2'-0"	1'-9"	2'-9"
18"	2'-3"	2'-1"	3'-1"
24"	2'-10"	2'-8"	3'-8"
30"	3'-5"	3'-3"	4'-3"
36"	4'-0"	3'-10"	4'-9"
42"	4'-7"	4'-5"	5'-5"
48"	5'-2"	5'-0"	6'-0"

PIPE ELBOW SECTION (PRE-FABRICATED)



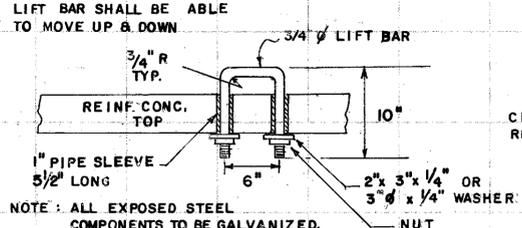
- NOTES FOR PIPE ELBOW:**
- PAYMENT FOR LIN. FT. OF PIPE INCLUDES ELBOWS.
 - ELBOW ANGLE Δ SHALL VARY ACCORDING TO NEED, BUT SHALL NOT BE GREATER THAN 45°. THE CONTRACTOR SHALL INFORM PRODUCER AS TO ANGLE REQUIRED.
 - (a) CONCRETE PIPE SHALL BE CUT BEFORE BEING CURED AND STEEL EXPOSED FROM EACH SIDE OF CUT.
(b) EXPOSED STEEL SHALL BE REJOINED. FILLER RODS AT LEAST EQUAL TO RODS IN PIPE SHALL BE ADDED AS NEEDED FOR HANDLING STRENGTH & TO HOLD GROUT.
(c) ALL VOID IN SPLICE SHALL BE PACKED WITH GROUT MORTAR RICH ENOUGH TO GIVE STRENGTH AT LEAST EQUAL TO REMOVED CONCRETE WITH INSIDE SMOOTHED OUT.
 - C.M. PIPE ELBOW NOT SHOWN, BUT MAY BE SPECIFIED. SOLID WELD SHALL BE REQUIRED FOR C.M. ELBOW JOINT WITH GALVANIZING AND/OR COATINGS REPAIRED AS REQ'D.

BOLT, RING & WASHER DETAILS



WASHER, BOLT & RING TO BE GALV. STEEL OR WROUGHT IRON RING TO BE PLACED IN EYE OF BOLT BEFORE LEAVING SHOP.

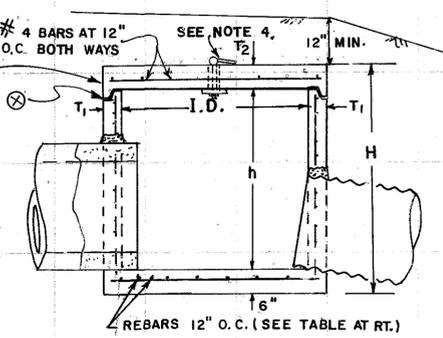
STEEL LIFTING BAR DETAIL



NOTE: ALL EXPOSED STEEL COMPONENTS TO BE GALVANIZED.

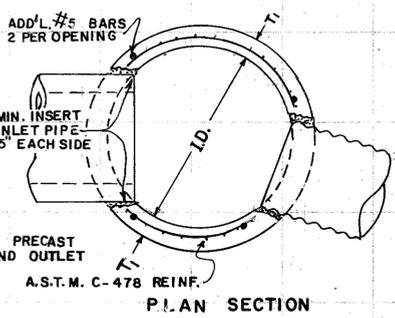
DETAILS OF CIRCULAR PRECAST JUNCTION BOX

(REINFORCING AND DESIGN SHALL COMPLY WITH A.S.T.M. C-478 EXCEPT AS OTHERWISE SHOWN. MATERIALS SHALL COMPLY WITH GA. STD. SPECIFICATIONS FOR PRECAST MANHOLES)



I.D.	T ₁ (MIN.)	T ₂ (MIN.)	MAX. PIPE CONC. C.M.	REBARS IN BOTTOM
4'-0"	5"	6"	30"	#5
5'-0"	5"	8"	42"	#5
6'-0"	6"	8"	48"	#6

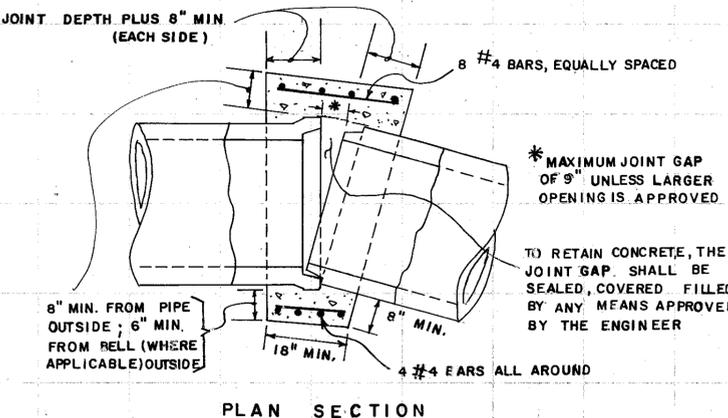
PIPE SIZE	MIN. h	MIN. H
15"	1'-10"	2'-10"
18"	2'-2"	3'-2"
24"	2'-9"	3'-9"
30"	3'-2"	4'-4"
36"	4'-0"	5'-2"
42"	4'-7"	5'-9"
48"	5'-2"	6'-4"



NOTE: OPENINGS SHALL BE PRECAST FOR BOTH INLET AND OUTLET

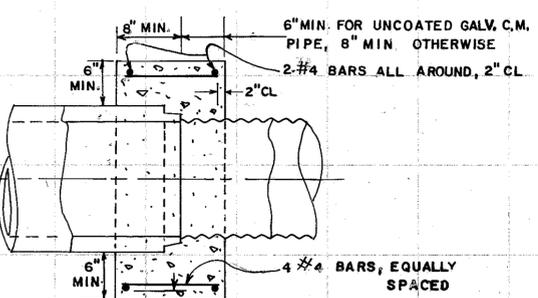
A.S.T.M. C-478 REINF.

CONCRETE COLLAR FOR DEFLECTING PIPE



- NOTES FOR CONCRETE COLLARS:**
- PERIMETERS OF CONCRETE COLLARS DO NOT HAVE TO BE SMOOTH LINES. COLLARS MAY BE FORMED AGAINST COMPACTED OR UNDISTURBED SOIL. DIMENSIONS ARE MINIMUM. COLLAR MAY VARY SO LONG AS MINIMUM DIMENSIONS ARE OBTAINED.
 - ALL CONCRETE COLLARS ARE TO BE CONSTRUCTED WITH CLASS A CONCRETE.
 - PAYMENT FOR LIN. FT. OF PIPE INCLUDES COLLARS.

CONCRETE COLLAR FOR JOINTING PIPE



PLAN OR SIDE SECTION

GENERAL NOTES:

- SPECIFICATIONS GEORGIA STANDARD, CURRENT EDITION & SUPPLEMENTS THERETO.
- ILLUSTRATED PIPES, PIPE JOINTS, ALIGNMENT, SIZES, ETC. ARE SHOWN AS REPRESENTATIVE, ACTUAL REQUIREMENTS VARY PER LOCATION AS INDICATED IN THE PLANS.
- JUNCTION BOXES DO NOT HAVE TO BE CONSTRUCTED SQUARE. W & W₁ DIMENSIONS MAY VARY ACCORDING TO PIPE SIZE.
- ALL JUNCTION BOX TOPS SHALL BE EQUIPPED WITH EITHER AN EYE BOLT & RING (SHOWN) OR A LIFTING BAR (ALTERNATE).
- REINFORCING IS REQUIRED FOR ALL PRECAST JUNCTION BOXES. REINFORCING MAY BE OMITTED FOR BUILT IN PLACE CONCRETE BOXES NOT OVER 10 FT. DEEP AND NOT LARGER THAN 3' x 3'. CONSTRUCTION JOINTS PERMITTED IF DOWELED OR KEYED. ALL JUNCTION BOX TOPS SHALL BE REINFORCED.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

STANDARD
PRECAST OR BUILT IN PLACE
JUNCTION BOXES
PIPE COLLARS, PIPE ELBOW
& PIPE CURVED ALIGNMENT

NO SCALE
REV. & REDR. JULY 1985
DES. RML (SUBMITTED) *Halley Hardy*
DRW. RML STATE ROAD & AIRPORT DESIGN ENGR.
TRA. GME (APPROVED) *Hal Rivers*
CHK. RKC STATE HIGHWAY ENGINEER
NUMBER 9031U