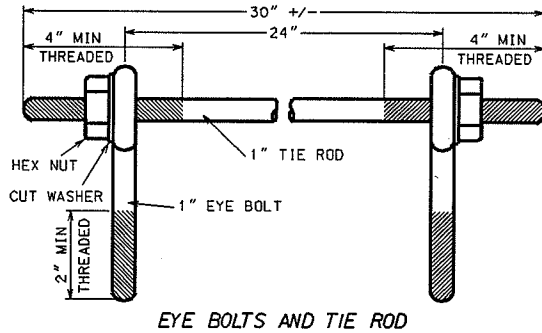
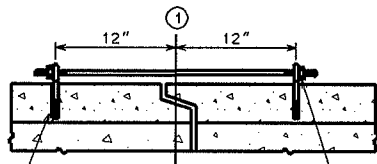


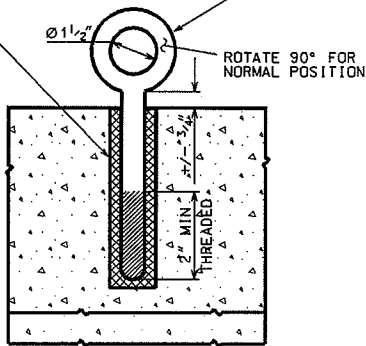
ALTERNATE 1
EYE BOLT AND TIE ROD ASSEMBLY
 (JOINT TIES FOR 12" DIA AND OVER CONCRETE PIPE)



EYE BOLTS AND TIE ROD

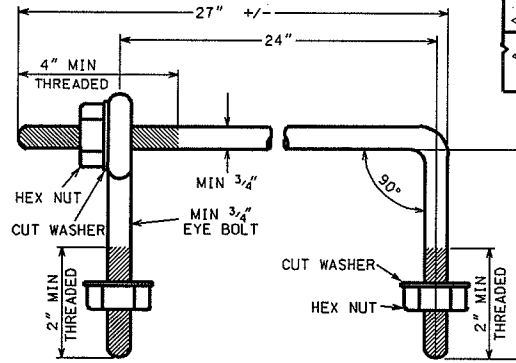


② INSERT, CAST-IN-PLACE DURING FABRICATION FOR 1" DIA. EYE BOLT



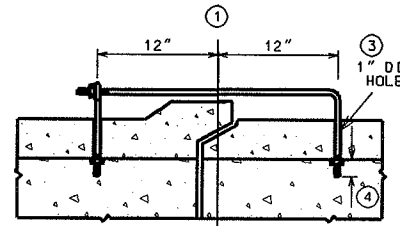
(CAST-IN-PLACE THREADED INSERT)
 LONGITUDINAL SECTIONS

ALTERNATE 2
EYE BOLT AND TIE ROD ASSEMBLY
 (JOINT TIES FOR 18" TO 66" DIA CONCRETE PIPE)

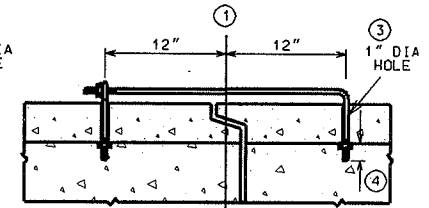


EYE BOLT AND TIE ROD

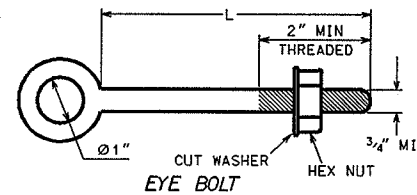
NOTE: TWO EYE BOLTS MAY BE USED WITH A 30" LONG THREADED ROD IN LIEU OF THE 90° BENT TIE ROD



(MODIFIED BELL PIPE)
 LONGITUDINAL SECTION



(TONGUE AND GROOVE PIPE)
 LONGITUDINAL SECTION

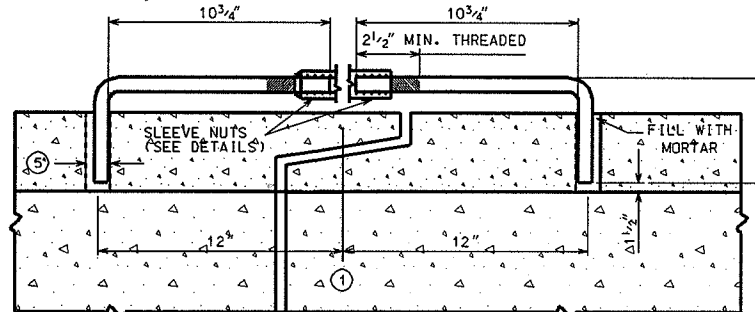


EYE BOLT

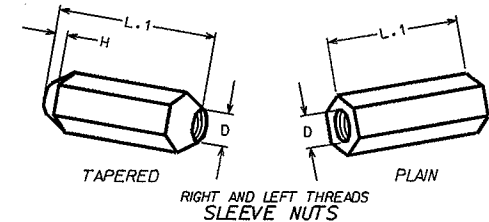
PIPE SIZE	L = LENGTH	
	TONGUE & GROOVE PIPE	MODIFIED BELL PIPE
18" TO 24"	4 1/2"	6 1/4"
30"	5"	7"
36"	5 1/2"	7"
42"	6"	
48"	6 1/2"	
60"	7 1/2"	
66"	8"	

EYE BOLT DIMENSION TABLE

ALTERNATE 3
ADJUSTABLE TIE ROD
 (JOINT TIES FOR 12" TO 108" DIA CONCRETE PIPE)



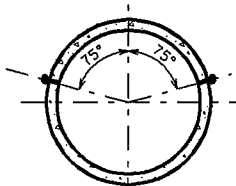
LONGITUDINAL SECTION



PIPE DIAMETER	TIE ROD DIAMETER	D	L-1	H	R
12" TO 30"	1/2"	1/2"	5"	1 1/2"	1 3/4"
66" TO 84"	3/4"	3/4"	5"	1 1/2"	5"
90" TO 104"	1"	1"	7"	1 1/16"	7 1/2"

ADJUSTABLE TIE ROD TABLE

PLACEMENT OF (2) CAST-IN-PLACE INSERTS OR HOLES DURING FABRICATION FOR PIPE SECTIONS REQUIRING TIE RODS



TRANSVERSE SECTION

GENERAL NOTES:

CONCRETE CULVERT PIPE SHALL BE TIED TOGETHER IN THE MANNER ILLUSTRATED BY THIS DETAIL AND PER STANDARD SPEC. 502.7 (D) AT LOCATION DESIGNATED ON THE PLAN. THE CONTRACTOR MAY USE EITHER ALTERNATE 1, 2, OR 3 FOR DRAINAGE STRUCTURES. ONLY ALTERNATE 1 AND 3 MAY BE USED FOR CATTLE PASSES, UNLESS OTHERWISE STATED IN THE CONTRACT. THE MATERIALS, FABRICATION AND WORK NECESSARY TO THE CULVERT PIPE AS INDICATED ON THE PLANS AND BY THIS DETAIL WILL BE CONSIDERED INCIDENTAL TO CULVERT PIPE, REINFORCED CONCRETE CULVERT PIPE, OR REINFORCED CONCRETE PIPE CATTLE PASS.

DETAILED DRAWINGS FOR PROPOSED ALTERNATE DESIGNS FOR JOINT TIES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

- ① Ø OF TONGUE AND GROOVE OR BELL AND SPIGOT JOINTS
- ② THE INSIDE OF THE THREADED INSERTS SHALL BE CLEAN TO ALLOW THE INSERTION OF THREADED EYE BOLTS
- ③ HOLES SHALL BE CAST-IN-PLACE OR DRILLED, 12" FROM Ø OF TONGUE AND GROOVE
- ④ BOLT PROJECTION INSIDE OF PIPE SHALL NOT EXCEED 2"
- ⑤ ROD DIAMETER = 1 INCH

CITY OF MADISON
 ENGINEERING DIVISION
**CONCRETE PIPE
 JOINT TIES**

STANDARD DETAIL DRAWING 5.4.6