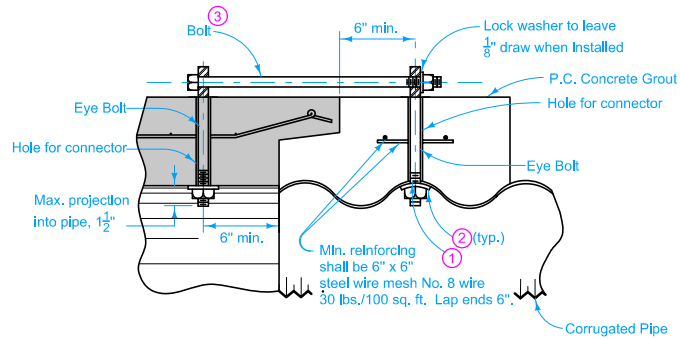
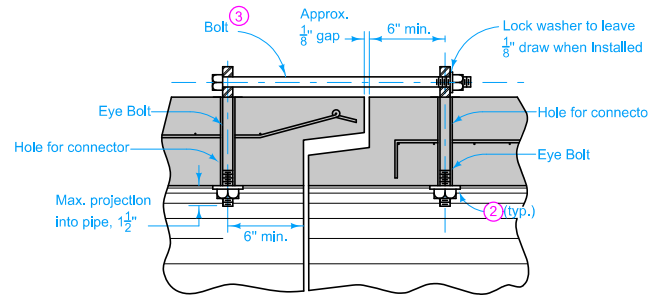


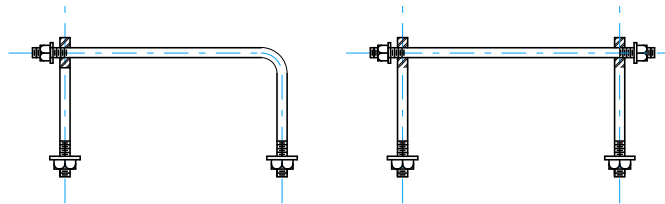
# Attachment E



**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Corrugated Pipe)**



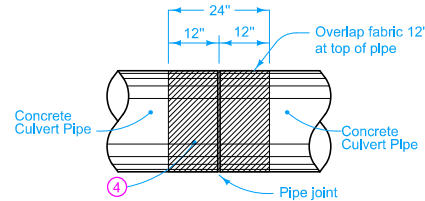
**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Concrete Pipe)**



**ONE BEND END**

**THREADED AT BOTH ENDS**

**OPTIONAL BOLTS/CONNECTORS**



**PIPE JOINT WRAPPING**

PIPE SIZE (in.)	CONNECTOR AND BOLT SIZE (in.)	HOLE FOR CONNECTOR (in.)
12 to 27	5/8	7/8
30 to 60	3/4	1.0
66 to 132	1.0	1 1/4

Wrap all joints on concrete roadway pipe culverts.

Use Type 3 Connections on all culvert pipes, unless specified otherwise. Refer to Materials I.M. 445.01 for Connector requirements.

Minimum 2 threads showing at all threaded ends.

Connections not required on pipe sections installed by trenchless methods.

For belled concrete pipe joints, connectors may be installed on the inside of the pipe.

## TYPE 1

One connector at the top of the pipe section.

## TYPE 2 (Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required. Refer to Materials I.M. 491.09 for seal requirements.

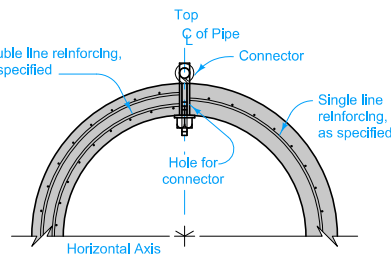
## TYPE 3 (Non - Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required.

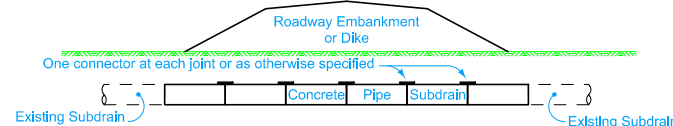
**Connect all joints.**

- If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x 1/4 in. plate on bolts through corrugated metal pipe and tightening nuts.
- 1 1/2 inch round x 5/8 inch thick washer or 3 in. x 3 in. x 1/4 in. square plate (shaped to pipe radius).
- Connectors with One Bend End and Bell End spacers allowed per Materials I.M. 451. Refer to Optional Bolts detail.
- Engineering fabric for embankment erosion control.

Possible Tabulations:  
104-3  
104-5B



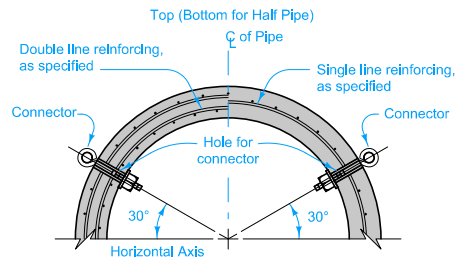
**TYPICAL SECTION  
(Non-Sealed Joint)**



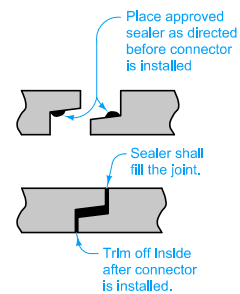
**TYPICAL INSTALLATION**

**TYPE 1 CONNECTION**

	REVISION	
	3	10-17-17
	STANDARD ROAD PLAN	
	DR-121	
SHEET 1 of 2		
REVISIONS: Added 104-5B to Possible Tabulations. Added Type 3 connection to storm sewer outlet.		
APPROVED BY DESIGN METHODS ENGINEER 		
<b>CONNECTED PIPE JOINTS</b>		

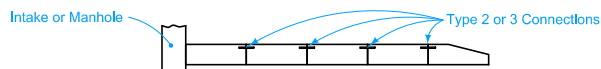


**TYPICAL SECTION  
TYPE 2 CONNECTION  
TYPE 3 CONNECTION**

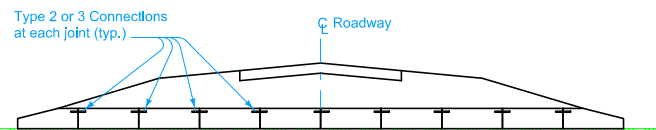


**SEALED JOINT  
TYPE 2 CONNECTION**

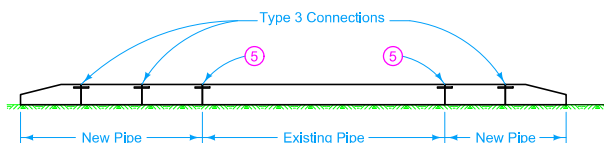
- ⑤ On culvert extensions, connect all new joints including the joint between the old and new culvert pipe. Holes may need to be drilled into existing pipes.



**TYPICAL INSTALLATION  
STORM SEWER OUTLET - TYPE 2 OR TYPE 3 CONNECTION**





**TYPICAL INSTALLATION  
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION**



**TYPICAL INSTALLATION  
PIPE EXTENSION - TYPE 3 CONNECTION**

TYPE 2 AND TYPE 3 CONNECTIONS

 <b>IOWA DOT</b> <b>STANDARD ROAD PLAN</b>  REVISIONS: Added 104-5B to Possible Tabulations. Added Type 3 connection to storm sewer outlet.	REVISION	
	3	10-17-
	<b>DR-121</b>	
	SHEET 2 of 2	
 APPROVED BY DESIGN METHODS ENGINEER		
<b>CONNECTED PIPE JOINTS</b>		