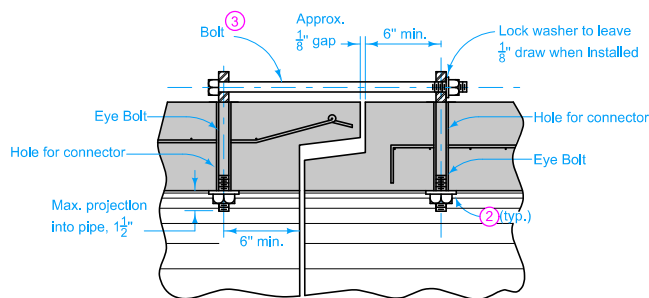
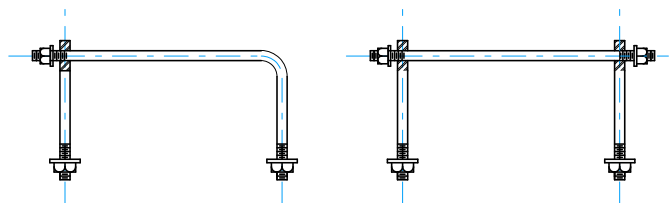


**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Corrugated Pipe)**



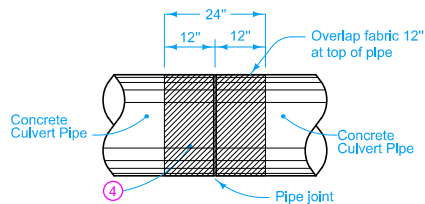
**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Concrete Pipe)**



**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 otherwise specified. Refer to Materials I.M. 445.01 for Connector requirements.

Minimum 2 threads showing at all threaded ends.

#### TYPE 1

One connector at the top of the pipe section.

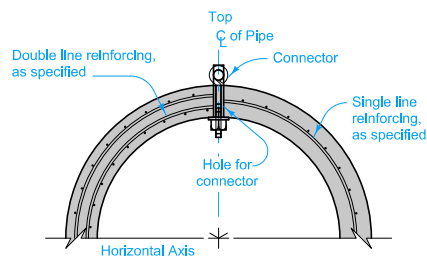
#### TYPE 2 (Sealed Joint)

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.

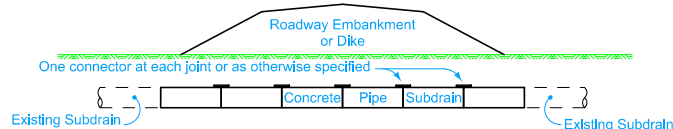
#### TYPE 3 (Non - Sealed Joint)

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

- (1) 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.
- (2) 1 3/4 inch round x 9/64 inch thick washer or 3 in. x 3 in. x 1/4 in. square plate (shaped to pipe radius).
- (3) Connectors with One Bend End and Bell End spacers allowed per Materials I.M. 451. Refer to Optional Bolts detail.
- (4) Engineering fabric for embankment erosion control.



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

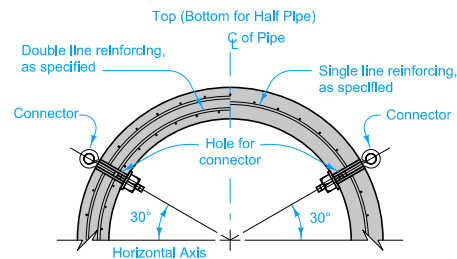


**TYPICAL INSTALLATION**

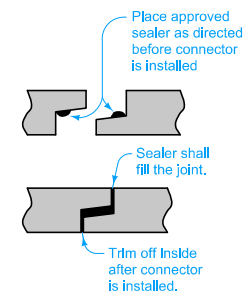
Possible Tabulation:  
104-3

	REVISION	
	15	10-18-11
	<b>STANDARD ROAD PLAN</b>	
	<b>RF-14</b>	
SHEET 1 of 2		
REVISIONS: Added details to allow for alternate tie rods per revised Materials I.M.451, table for connector bar sizes and circle note 3. Changed RF-1 references.		
Deanna Macfadyen APPROVED BY DESIGN METHODS ENGINEER		
<b>CONNECTED PIPE JOINTS</b>		

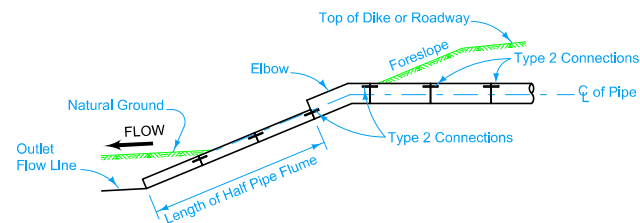
**TYPE 1 CONNECTION**



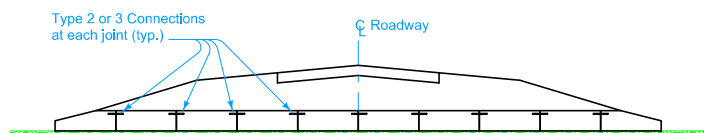
**TYPICAL SECTION  
TYPE 2 CONNECTION  
TYPE 3 CONNECTION**



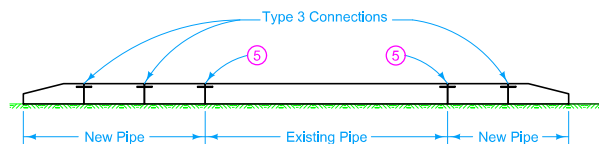
**SEALED JOINT  
TYPE 2 CONNECTION**



**TYPICAL INSTALLATION  
TYPE 2 CONNECTION**




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



**TYPICAL INSTALLATION  
PIPE EXTENSION - TYPE 3 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.

**TYPE 2 AND TYPE 3 CONNECTIONS**

 <b>Iowa Department of Transportation</b>  <b>STANDARD ROAD PLAN</b>  REVISIONS: Added details to allow for alternate tie rods per revised Materials LM451, table for connector bar sizes and circle note 3. Changed RF-1 references.  <i>Deanna Macfadyen</i> APPROVED BY DESIGN METHODS ENGINEER	REVISION	
	15	10-18-11
	<b>RF-14</b>	
	SHEET 2 of 2	
<b>CONNECTED PIPE JOINTS</b>		