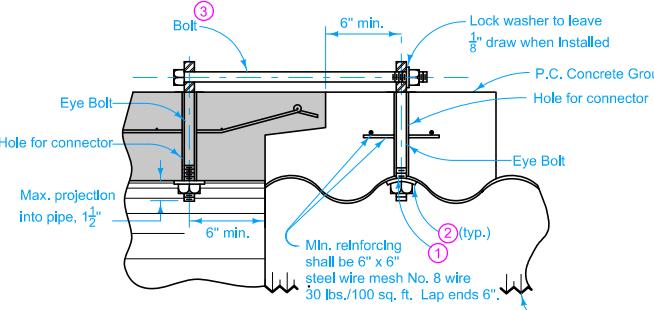
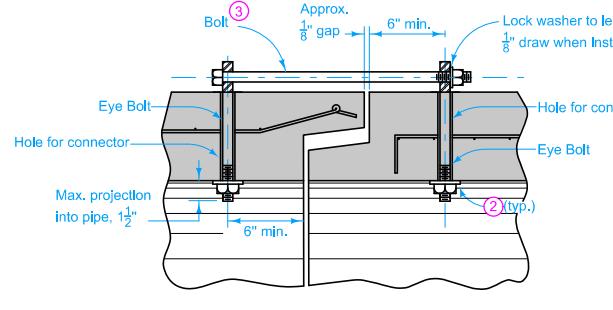


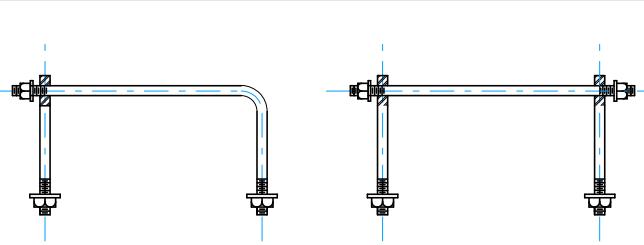
Attachment E



SECTION OF PIPE CONNECTOR
(Concrete Pipe to Corrugated Pipe)

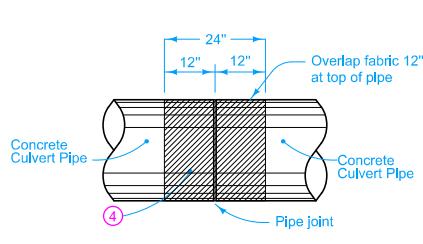


SECTION OF PIPE CONNECTOR
(Concrete Pipe to Concrete Pipe)



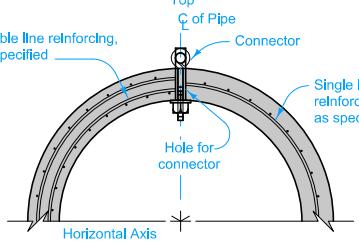
ONE BEND END **THREADED AT BOTH ENDS**

OPTIONAL BOLTS/CONNECTORS

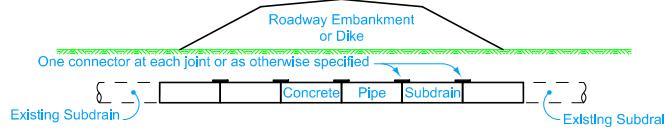


PIPE JOINT WRAPPING

PIPE SIZE (In.)	CONNECTOR AND BOLT SIZE (In.)	HOLE FOR CONNECTOR (In.)
12 to 27	$\frac{5}{8}$	$\frac{7}{8}$
30 to 60	$\frac{3}{4}$	1.0
66 to 132	1.0	$1\frac{1}{4}$



TYPICAL SECTION
(Non-Sealed Joint)



TYPICAL INSTALLATION

TYPE 1 CONNECTION

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.

① If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x $\frac{1}{4}$ in. plate on bolts through corrugated metal pipe and tightening nuts.

② $1\frac{3}{4}$ inch round x $\frac{9}{32}$ inch thick washer or 3 in. x 3 in. x $\frac{1}{4}$ 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.

Possible Tabulations:

104-3
104-5B

REVISION
3 10-17-17

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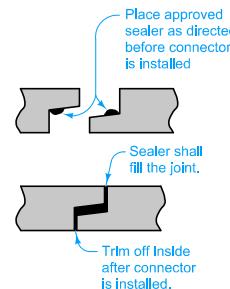
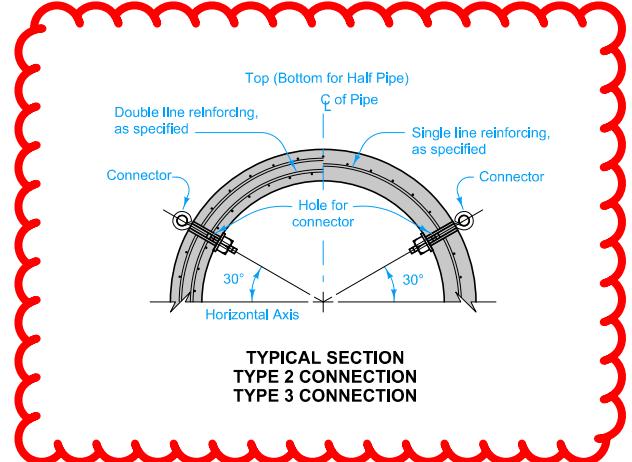
STANDARD ROAD PLAN

SHEET 1 of 2

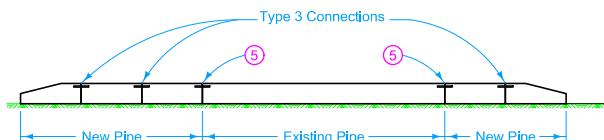
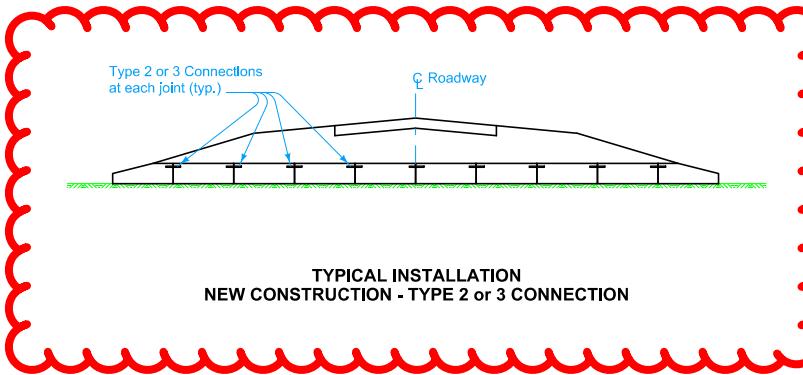
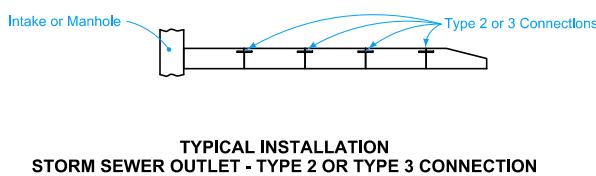
REVISIONS: Added 104-5B to Possible Tabulations. Added Type 3 connection to storm sewer outlet.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

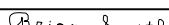
CONNECTED PIPE JOINTS



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

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