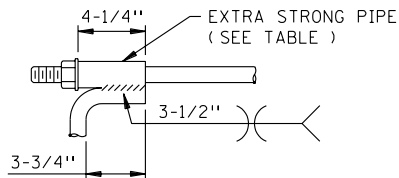
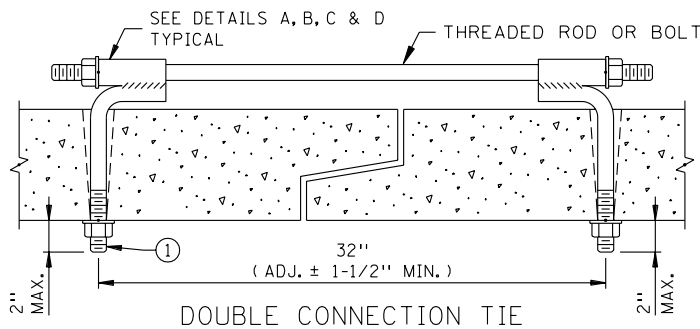
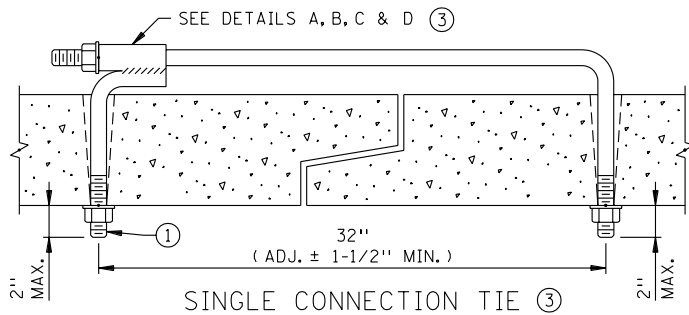
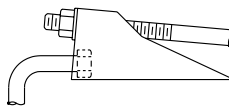


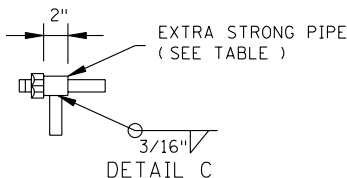
OPTIONAL RECESS DETAIL ②



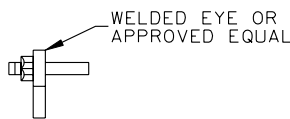
DETAIL A



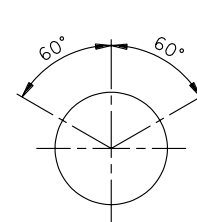
DETAIL B



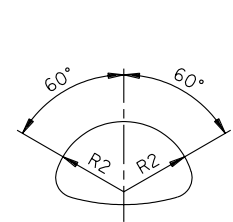
DETAIL C



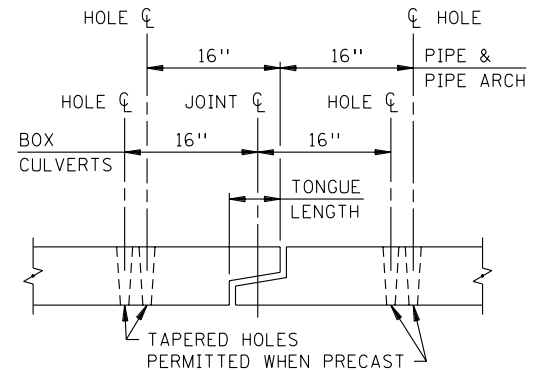
DETAIL D



ROUND PIPE



PIPE-ARCH



HOLES SHALL BE CAST OR DRILLED 16" FROM CENTERLINE OF JOINTS FOR BOX CULVERTS, AS SHOWN ABOVE, UNLESS FORMS ARE SET UP FOR 16" SPACING FROM OUTSIDE OF JOINT.

PLACEMENT OF HOLES

PIPE SIZE (INCHES)	ROD THREAD DIA.
12 - 27	5/8"
30 - 66	3/4"
72 - 108	1"

ROD THREAD DIA.	EXTRA STRONG PIPE INSIDE DIA.
5/8"	3/4"
3/4"	1"
1"	1-1/4"

PIPE SIZE LISTED IS INSIDE DIA. OF ROUND PIPE OR EQUIVALENT DIA. OF PIPE ARCH.

NOTES:

FOR CONC. CULVERTS, PIPE TIES SHALL BE REQUIRED FOR ALL JOINTS UNLESS OTHERWISE SPECIFIED IN THE PLANS OR IN THE SPECIAL PROVISIONS.

FOR CONCRETE SEWERS, TIE THE THREE END SECTIONS (INCLUDING APRON) OF A FREE END (NO MANHOLE).

NUTS AND WASHERS ARE NOT REQUIRED ON INSIDE OF PIPES 27" OR LESS IN DIAMETER.

ON BELL PIPE LARGER THAN 24", TIES MAY BE INSERTED FROM THE INSIDE.

TIE RODS SHALL BE GALVANIZED AS PER SPEC. 3392 OR POWER WASHED AND DIPPED IN AN APPROVED ZINC RICH EPOXY PRIME PAINT AFTER FABRICATION. THE LIST FOR APPROVED PAINT COATING OF CONCRETE PIPE TIES IS LOCATED ELECTRONICALLY AT <http://www.mrr.dot.state.mn.us/> PICK MATERIALS ENGINEERING SECTION, PICK APPROVED PRODUCTS LIST. STEEL SHALL CONFORM TO SPEC. 3306 OR EQUAL.

TIES TO BE USED ONLY TO HOLD PIPE SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

- ① TIE ROD THREADS SHALL PROJECT TO THE INSIDE OF PIPE EXCEPT AS NOTED IN PLANS.
- ② TIE ROD THREADS SHALL BE RECESSED WHEN PIPE IS USED AS CATTLE PASS OR PEDESTRIAN TRAIL.
- ③ TIE ROD THREADS MAY PROJECT TO OUTSIDE OF BOX CULVERT PIPE IN MULTIPLE PIPELINE INSTALLATIONS. FACE CONNECTION DOWN STREAM.

APPROVED MAY 7, 2004
M. Rakus
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
CONCRETE PIPE TIES

SPECIFICATION REFERENCE
2501
2503

STANDARD PLATE NO.
3145F