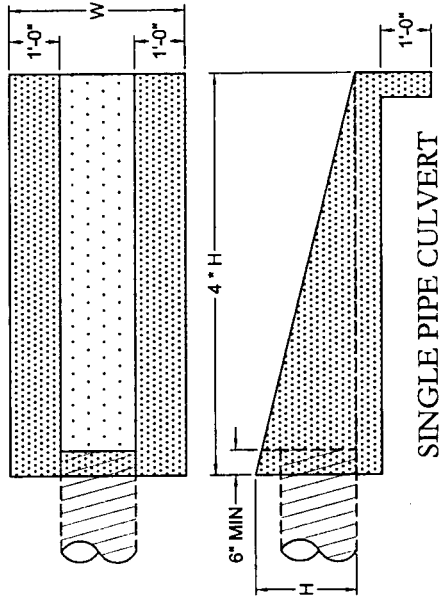
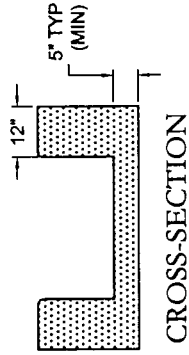


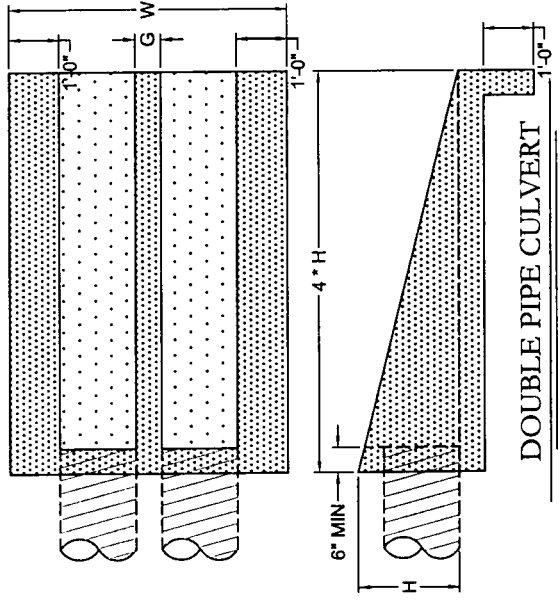
SAFETY END TREATMENT WITHOUT SLOPED INSERTS



SINGLE PIPE CULVERT

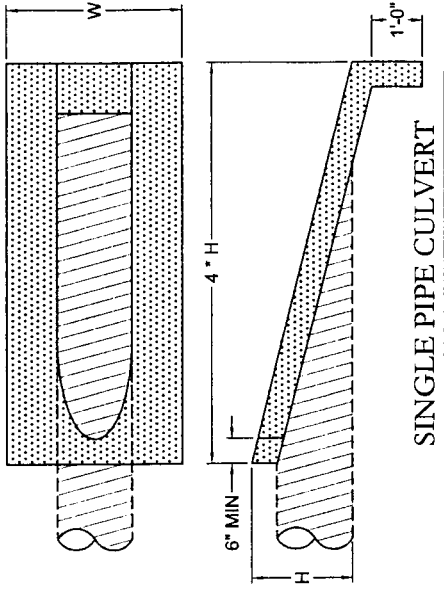


CROSS-SECTION

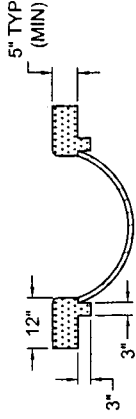


DOUBLE PIPE CULVERT

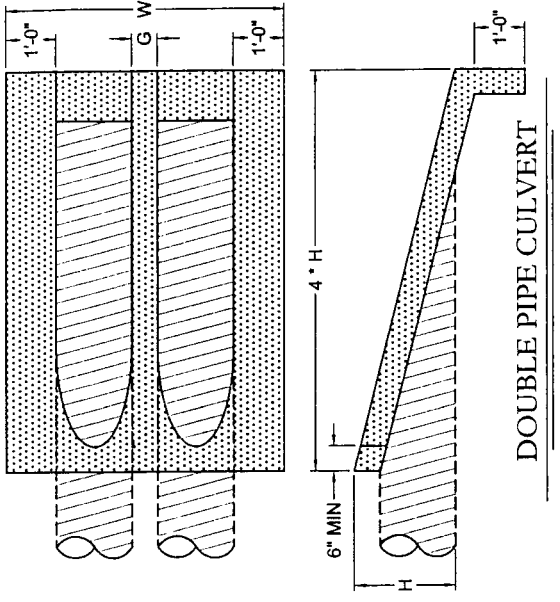
SAFETY END TREATMENT WITH SLOPED INSERTS



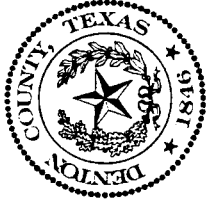
SINGLE PIPE CULVERT



CROSS-SECTION



DOUBLE PIPE CULVERT



THIS DOCUMENT CONTAINS INFORMATION WHICH IS REGARDED AS STANDARD TYPICAL INFORMATION. ANY AND ALL SITUATIONS MAY BE SUBJECT TO CHANGE BY A DENTON COUNTY PUBLIC WORKS PROFESSIONAL. PLEASE CONSIDER THE INFORMATION CONTAINED WITHIN THIS DOCUMENT TO BE MINIMUM STANDARD VALUES.

SIZE OF PIPE (Dia.)	W	H
15"	3' - 3"	1' - 9"
18"	3' - 6"	2' - 0"
21"	3' - 9"	2' - 3"
24"	4' - 0"	2' - 6"
30"	4' - 6"	3' - 0"
36"	5' - 0"	3' - 6"

SIZE OF PIPE (Dia.)	W	H	G
2 - 15"	5' - 0"	1' - 9"	0' - 6"
2 - 18"	5' - 6"	2' - 0"	0' - 6"
2 - 21"	6' - 0"	2' - 3"	0' - 6"
2 - 24"	6' - 6"	2' - 6"	0' - 6"
2 - 30"	8' - 0"	3' - 0"	1' - 0"
2 - 36"	9' - 0"	3' - 6"	1' - 0"

SIZE OF PIPE (Dia.)	CONDITION FOR USE OF CROSS PIPES	CROSS PIPE SIZE
12"		
15"		
18"	3 or more Pipe Culverts	3" Std. (3.500" O.D.)
21"		
24"		
30"	2 or more Pipe Culverts	3 1/2" Std. (4.000" O.D.)
36"	All Pipe Culverts	4" Std. (4.500" O.D.)

* Additional requirements as shown on the above-mentioned TXDOT detail sheet must be met to meet approval.

TYPICAL DRIVEWAY CULVERT SAFETY END TREATMENT



1. The Property Owner is responsible for placing a stake to mark the proposed location of the culvert.

2. Once the proposed location is marked, the Property Owner/Contractor must notify the Engineering Division.



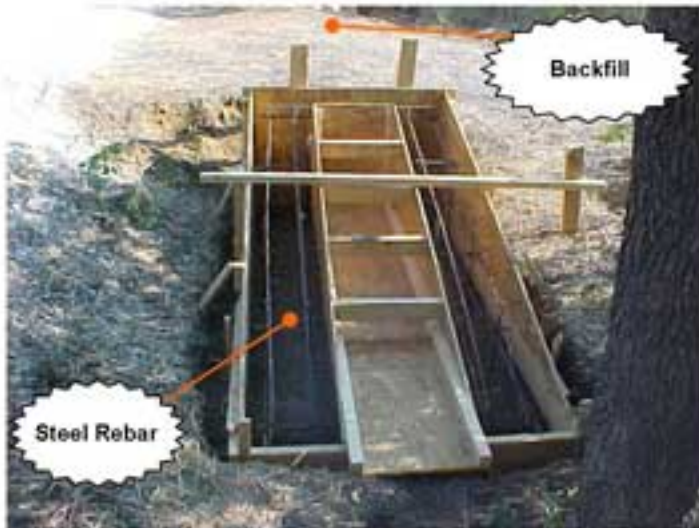
3. Within 10 working days of this notification, the Engineering Division will provide the Property Owner with the size and number of culverts to be installed, and will place grade stakes marking the new culvert centerline and the depth of cut or fill for the flow-line of the culvert ends.



4. All culverts must be galvanized corrugated steel only. The minimum length is 20 feet. The maximum length is 60 feet. This does not include the length of the 4:1 sloped safety ends.



5-A. The Owner/Contractor must call for an inspection after the culvert has been set at the grades shown on the grade stakes prior to covering the culvert.



5-B. The Owner/Contractor must call for an inspection after the culvert safety ends (4:1 sloped ends) have been formed and are ready for inspection.

The form work and steel must be complete per County specifications and the culvert must be backfilled.



Helpful Hints:

- Remember it is up to you to contact the inspector.
- Do not disturb or break the grade stakes until the culvert is set.
- Concrete, plastic, and fiberglass pipes are not acceptable.
- Pre-cut or pre-fabricated safety ends may seem like a shortcut, but cost more and are usually not to Denton County specifications.
- Remember to plan ahead and let the inspector know when you will be ready for an inspection at least two days in advance.
- Do not make assumptions! When in doubt, call your inspector. It is much cheaper and easier to correct formwork than to re-pour concrete.
- Backfilling and cleanup are important. Our goal is to leave the ditches in better condition than we found them.
- Remember the inspector is here to help you. The right questions now will help to avoid potential problems. Quality Control Inspector: 940-391-6119



Passed. A safety end treatment using entirely wooden form work. Because wood was used to construct the entire form, exact and correct dimensions were obtained. Having the floor cast with the top and sides makes for a stronger, longer lasting structure as well. The square channel in the middle matches the diameter of the pipe. Backfilling and clean-up have been completed as well. This is a near perfect example.



Side-slope



Vertical Wall

Failure of a safety treatment using a pre-fabricated metal end. These ends are not a correct form guide. They have a vertical lip at their top which is often mistaken as a guide for a vertical form wall. This lip also makes the sides too low as well, leading to steeply slanting side-slopes. Another fallacy with these pre-fabricated ends is they are often too short leading to a steep safety treatment. Additional inside form work is usually necessary for these ends to yield the proper result.