



• **BACKFILL REQUIREMENTS FOLLOW THE GUIDELINES OF AREMA PART 4, CULVERTS**

- ① IN-SITU SOIL STRENGTH AND GROUND WATER ELEVATION MUST BE CONSIDERED IN ORDER TO DETERMINE THE INITIAL FILL ENVELOPE WIDTH. CONSULT A QUALIFIED GEOTECHNICAL ENGINEER FOR DESIGN AS REQUIRED (4.14.3). THE MANUFACTURER'S SUGGESTED MINIMUM VALUES ARE:  
TRENCH =  $1.5D + 12"$   
EMBANKMENT =  $3.0D$  BUT NOT LESS THAN  $D + 4'-0"$ .
- ② THE FOUNDATION UNDER THE PIPE AND SIDE BACKFILL SHALL BE ADEQUATE TO SUPPORT THE LOADS ACTING UPON IT (4.14.4).
- ③ BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, AND SEVERAL INCHES IN THICKNESS (4.14.7).
- ④ CORRUGATED STEEL PIPE (CSP) [HEL-COR].
- ⑤ HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION (FIGURE 1-4-24).
- ⑤a INITIAL BACKFILL FOR PIPE EMBEDMENT TO BE A WELL GRADED GRANULAR MATERIAL (4.14.7.b) COMPACTED TO 90% STANDARD PROCTOR PER ASTM D698. ALL LIFTS PLACED IN A CONTROLLED MANNER. THE SELECTED BACKFILL MATERIAL SHOULD BE PLACED IN LAYERS NOT EXCEEDING 6 INCHES TO 8 INCHES THICKNESS AND COMPACTED TO THE SPECIFIED DENSITY AT OR NEAR OPTIMUM MOISTURE CONTENT. CARE MUST BE TAKEN TO MAINTAIN BALANCED LOADING ON THE PIPE CULVERT BY KEEPING THE FILL LEVEL APPROXIMATELY EQUAL ON BOTH SIDES OF THE PIPE AT ALL TIMES (4.14.7.d).
- ⑥ INITIAL BACKFILL ABOVE PIPE MAY INCLUDE BALLAST MATERIAL IF THE MINIMUM COVER HEIGHT IS MET. THE MINIMUM COVER HEIGHT IS MEASURED FROM BASE OF CROSS TIE TO TOP OUTSIDE OF PIPE (SEE TABLES 1-4-31 THROUGH 1-4-36).
- ⑥a TOTAL HEIGHT OF COMPACTED COVER FOR COOPER E-80 LOADS IS MEASURED FROM BASE OF CROSS TIE TO TOP OUTSIDE OF PIPE (TABLE 1-4-24).
- ⑦ FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD (4.14.7.g).

NOTES:

- GEOTEXTILE SHOULD BE CONSIDERED FOR USE TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES (4.14.7.b).
- FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIA./2 BUT NO LESS THAN 12", OR 36" FOR PIPE DIAMETERS 72" AND LARGER (FIGURE 1-4-25).
- CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

231-CSP-STANDARD BACKFILL-ROUND-AREMA

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PIPE SOLUTIONS

231 - CSP ROUND  
STANDARD BACKFILL DETAIL  
AREMA

DATE DRAWN: 11/15/15

REV #: --

REV DATE: --

SCALE: N.T.S.

DRAWING TYPE: --

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