

PIPE INSTALLATION PROCEDURES

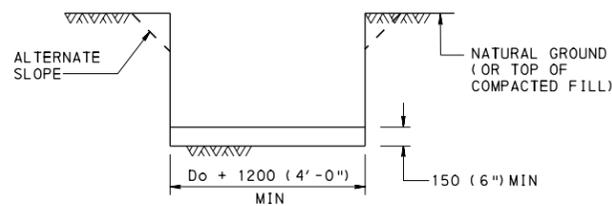
CONSTRUCTION DETAILS BELOW COVER THE FOLLOWING CONDITIONS:

- (A) PIPE LYING ON TOP OF THE NATURAL GROUND, ROCK OR COMPACTED (97% SPD) FILL.
- (B) THE EXISTING GROUND IS BETWEEN THE TOP AND THE BOTTOM OF THE PROPOSED PIPE AND THE PIPE IS TO BE COVERED WITH EARTH FILL.
- (C) THE TOP OF PIPE IS BELOW THE LEVEL OF THE NATURAL GROUND OR COMPACTED FILL (TO MINIMUM 97% SPD) AND TO BE COVERED WITH EARTH FILL TO HEIGHTS ABOVE THE NATURAL GROUND.

STEP 1 : REMOVE TOPSOIL (COMPRESSIBLE LAYER OF ORGANIC MATERIAL) TO A WIDTH EQUAL TO 5 OUTSIDE DIAMETERS OF THE PIPE IN ALL FILL CONDITIONS ABOVE (A), (B) & (C). ALSO IF SPECIFIED ON THE CONTRACT DRAWING, UNDERCUT FOR THE DEPTH BELOW THE BEDDING AS SHOWN BY DESIGN (MAKE MIN WIDTH 5 DIAMETERS OF PIPE). PAY AS CLASS 1 EXCAVATION.

STEP 2 : CONSTRUCT THE EMBANKMENT TO 1200 (4'-0") ABOVE THE TOP OF PIPE OR TO THE SUBGRADE ELEVATION, WHICHEVER IS LESS. FOR PIPES 1800 (72") OR GREATER SEE NOTE 1.

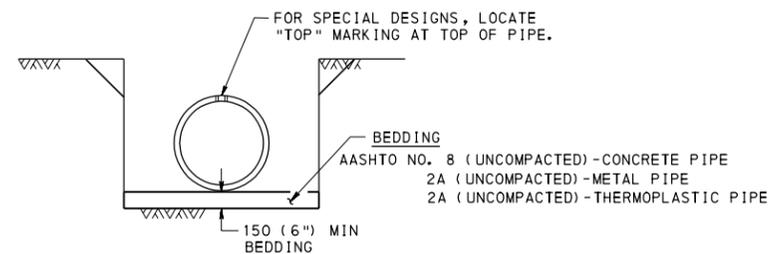
STEP 3 : EXCAVATE THE TRENCH TO THE WIDTH OF THE OUTSIDE DIAMETER OF THE PIPE BARREL PLUS 1200 (4'-0") AND CREATE AN APPROPRIATE BEDDING 150 (6") DEEP.



STEP 4 : FOR CONCRETE PIPE, IF THIS EXCAVATION IS THROUGH ROCK, OR HARD SHALE, OR IN AREAS OF UNDERCUT, PROVIDE 150+40 mm/m (6"+1/2" INCH/FT) OF Do+1200 (4'-0"), BELOW THE INTENDED BOTTOM ELEVATION OF THE PIPE, 400 (16") MAX.

NOTE: IF UNSUITABLE MATERIAL IS FOUND, UNDERCUT AS DIRECTED AND BACKFILL WITH SUITABLE MATERIAL TO BOTTOM OF BEDDING ELEVATION. (UNLESS OTHERWISE SPECIFIED.)

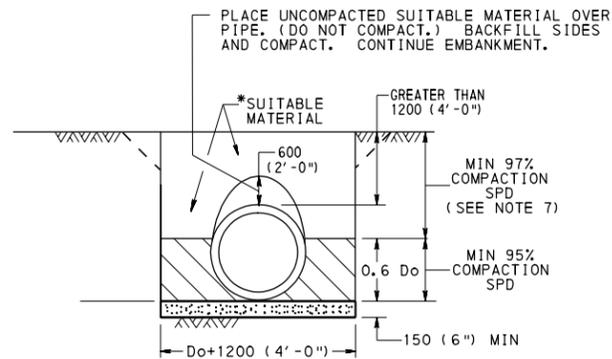
STEP 5 : LAY PIPE ON APPROPRIATE BEDDING. SEE STEP 6D FOR METAL PIPE ARCH AND METAL PLATE PIPE ARCH.



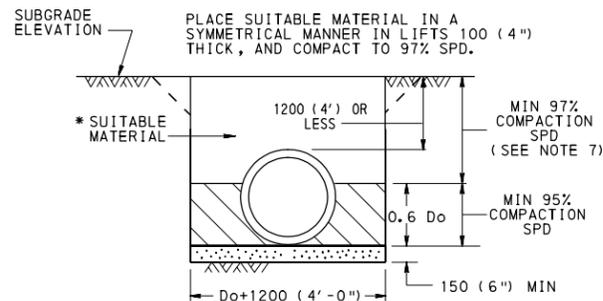
STEP 6 : FOR CONCRETE PIPE, SEE STEP 6A.
 : FOR METAL PIPE AND METAL PLATE PIPE, SEE STEP 6B.
 : FOR THERMOPLASTIC PIPE, SEE STEP 6C.
 : FOR METAL PIPE ARCH AND METAL PLATE PIPE ARCH, SEE STEP 6D.

STEP 6A : CONCRETE PIPE

PLACE 2A COARSE AGGREGATE MATERIAL, IN LIFTS 100 (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF 0.6 Do. COMPACT TO 95% SPD. TEST THE SIDE BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.



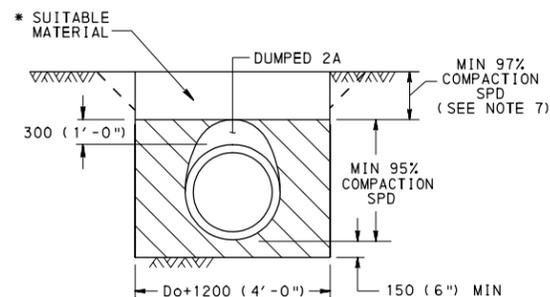
GREATER THAN 1.2 m (4') TO 14.6 m (48')
 FOR FILLS OVER 14.6 m (48'), SEE NOTE 8.



SHALLOW FILLS 1200 (4'-0") AND LESS

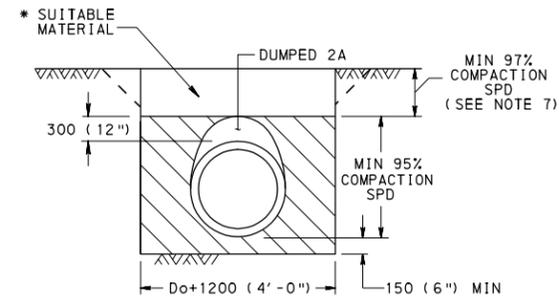
STEP 6B : METAL PIPE AND METAL PLATE PIPE

PLACE 2A COARSE AGGREGATE MATERIAL, IN LIFTS 100 (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF 300 (12") ABOVE TOP OF PIPE. COMPACT TO 95% SPD. TEST THE BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.



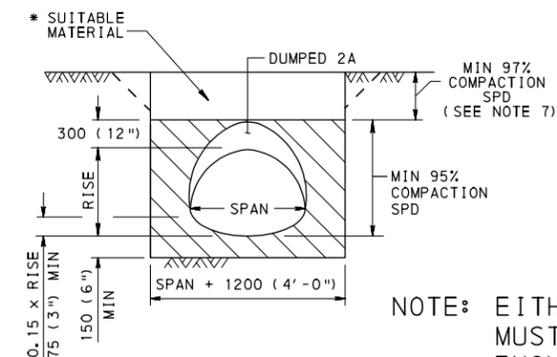
STEP 6C: THERMOPLASTIC PIPE

PLACE 2A COARSE AGGREGATE MATERIAL, IN LIFTS 100 (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF 300 (12") ABOVE TOP OF PIPE. COMPACT TO 95% SPD. TEST THE BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.



STEP 6D : METAL PIPE ARCH AND METAL PLATE PIPE ARCH

- (1) PLACE 2A COARSE AGGREGATE MATERIAL (0.15 x RISE) ON TOP OF THE BEDDING AND FORM THE CRADLE.
- (2) LAY THE PIPE ON THE PREPARED CRADLE.
- (3) PLACE 2A COARSE AGGREGATE MATERIAL, IN LIFTS 100 (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF 300 (12") ABOVE TOP OF PIPE. COMPACT TO 95% SPD. TEST THE BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.



NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

NOTES

1. THE INSTALLATION OF PIPES 1800 (72") OR GREATER INSIDE DIAMETER OR SPAN IS PERMITTED WITHOUT PLACING EMBANKMENT FIRST. MAKE THE BACKFILL ENVELOPE AS SHOWN ON THIS DRAWING EXCEPT PROVIDE 2A MATERIAL ON EACH SIDE OF THE PIPE EQUAL TO ONE OUTSIDE DIAMETER OR SPAN OF THE PIPE. FOR CONCRETE PIPE, THE WIDTH OF UNCOMPACTED AGGREGATE FOR BEDDING (AASHTO NO. 8) REMAINS AT Do + 1200 (4'-0"). PAYMENT FOR THE 2A MATERIAL IS AS PER NOTE 3.
2. A HIGHER STRENGTH PIPE THAN SPECIFIED MAY BE SUPPLIED AT NO ADDITIONAL COST TO THE DEPARTMENT.
3. PAYMENT FOR THE BACKFILL ENVELOPE INCLUDING BEDDING, COARSE AGGREGATE AND SUITABLE MATERIAL UP TO 300 (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.
4. TO PRECLUDE POINT LOADING ON RELATIVELY RIGID CONCRETE PIPE, DO NOT COMPACT AASHTO NO. 8 BEDDING MATERIAL.
5. FOR TRENCH BOX/SHORING INSTALLATION REQUIREMENTS REFER TO PUBLICATION 408, SECTION 601.
6. PERMIT PLACEMENT OF BACKFILL MATERIAL IN LAYERS, LIFTS, 200 (8") THICK WHEN USING VIBRATORY COMPACTION EQUIPMENT.
7. COMPACT TOP 1000 (3'-0") OF SUBGRADE TO 100% IN ACCORDANCE WITH PUBLICATION 408, SECTION 206.3.
8. FOR REINFORCED CONCRETE PIPES INSTALLED WITH GREATER THAN 14.6 m (48') OF FILL, PROVIDE 300 (12") BEDDING MINIMUM AND 400 (16") WHEN ROCK IS PRESENT.

LEGEND

- AGGREGATE FOR BEDDING (AASHTO NO. 8), UNCOMPACTED
- COARSE AGGREGATE (2A)

Do = OUTSIDE DIAMETER OF PIPE, MILLIMETERS (INCHES)
 SPD = STANDARD PROCTOR DENSITY
 ID = INSIDE DIAMETER

* SUITABLE MATERIAL = MATERIAL CONTAINING NO DEBRIS, ORGANIC MATTER, FROZEN MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN ONE-HALF THE THICKNESS OF THE COMPACTED LAYERS BEING PLACED.

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF DESIGN

SUBSURFACE DRAINS
 PIPE PLACEMENT
 EXCAVATION - BEDDING - BACKFILL

RECOMMENDED JUN. 1, 2010

R. Spick
 CHIEF, HWY. QA DIVISION

RECOMMENDED JUN. 1, 2010

Sam Thompson
 DIRECTOR, BUREAU OF DESIGN

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