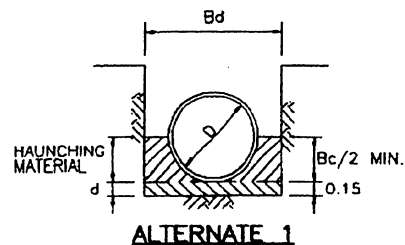
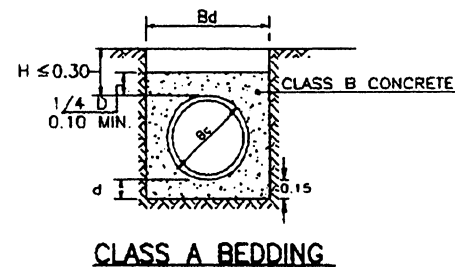
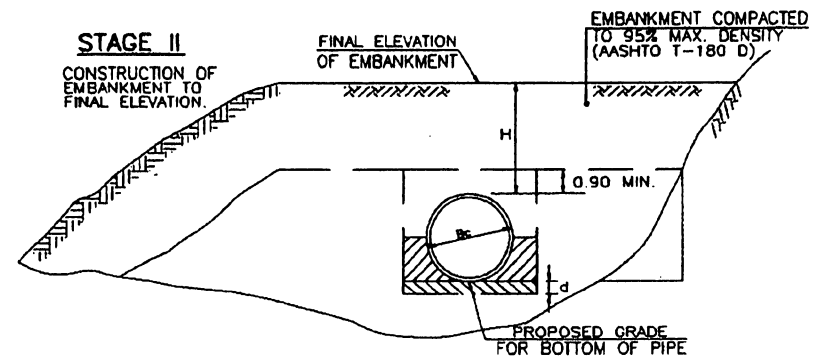
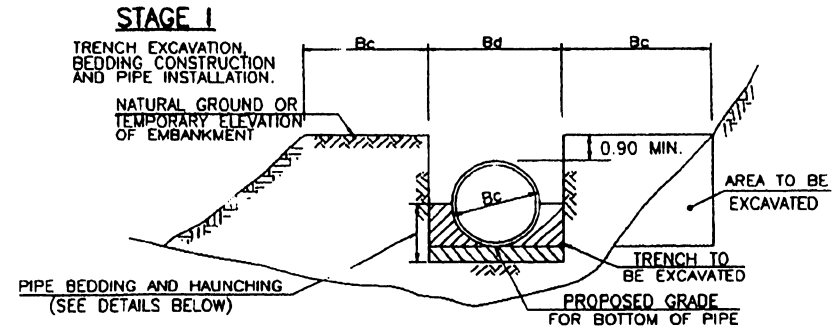
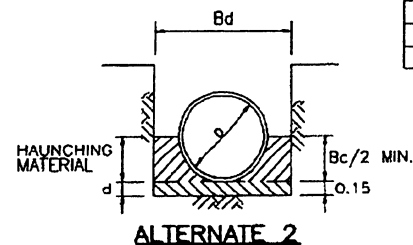


**NEGATIVE PROJECTION METHOD**



BEDDING AND HAUNCHING MATERIAL SHALL BE A-1, A-3 OR A-2-4 WHEN CLASSIFIED PER AASHTO M-145, AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY OBTAINED UNDER AASHTO T-180, METHOD D.

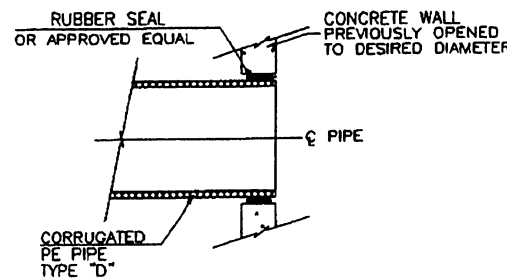
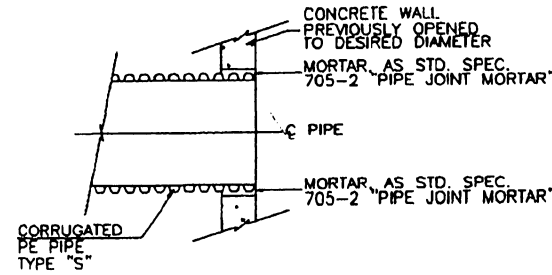
BACKFILL MATERIALS SHALL BE SOILS SUITABLE FOR EMBANKMENT CONSTRUCTION UNDER SPECIFICATION 203 AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY OBTAINED UNDER AASHTO T-180, METHOD D.



BEDDING AND HAUNCHING MATERIAL SHALL BE A WELL GRADED CRUSHED STONE WITH 100 PERCENT PASSING THE 1/4 INCH SIEVE AND NOT MORE THAN 10 PERCENT PASSING THE # 200 SIEVE AND COMPACTED IN CONFORMANCE WITH SPECIFICATION 304.

BACKFILL MATERIALS SHALL BE SOILS SUITABLE FOR EMBANKMENT CONSTRUCTION UNDER SPECIFICATION 203 AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY OBTAINED UNDER AASHTO T-180, METHOD D.

**BEDDING CLASS C AND HAUNCHING DETAIL**



**CONNECTION TO HEADWALL, CATCH BASIN AND INLET DETAILS**

PIPE (INSIDE) DIAMETER (D)		TRENCH WIDTH REQUIRED (Bd)		MINIMUM CLEAR DISTANCE BETWEEN PIPES		MAXIMUM COVER (H)		MINIMUM PIPE STIFFNESS	
IN.	MM	IN.	MM	IN.	MM	FT.	M	PSI	KPa
12	305	31	610	12	300	60	18	50	345
15	385	34	765	12	300	60	18	42	290
18	460	39	915	12	300	60	18	40	275
24	610	48	1220	14	350	60	18	34	235
30	765	66	1375	18	450	60	18	28	190
36	915	78	1525	22	550	60	18	22	150
42	1070	83	1680	24	600	60	18	19	130
48	1220	89	1830	27	680	60	18	17	120
54	1350	96	1980	27	680	60	18	16	110
60	1500	102	2130	27	680	60	18	14	95

**NOTE:**

CONTRACTOR MAY SUBSTITUTE THE NEXT LARGER DIAMETER PIPE IF THE PIPE SIZE CALLED FOR IN THE CONTRACT IS NOT AVAILABLE. SUCH SUBSTITUTION AND FURNISHING REDUCTION AND EXPANSION COUPLERS SHALL BE A SUBSIDIARY OBLIGATION.

**LEGEND:**

- Bd - MAXIMUM TRENCH WIDTH
- Bc - OUTSIDE PIPE DIAMETER
- H - HEIGHT OF FILL ABOVE TOP OF PIPE
- D - INSIDE PIPE DIAMETER
- d - DEPTH OF BEDDING MATERIAL BELOW PIPE

**NOTES:**

- 1- CORRUGATED POLYETHYLENE PIPE (PEP), SHALL CONFORM TO AASHTO M-294 FOR PIPE DIAMETERS FROM 12 INCH TO 36 INCH, AASHTO M6 FOR PIPE DIAMETERS FROM 42 INCH TO 48 INCH AND AASHTO MP7 FOR PIPE DIAMETERS FROM 54 INCH TO 60 INCH.
- 2- COUPLING OF PIPE SEGMENTS AND COUPLING OF FITTINGS SUCH AS ELBOWS, REDUCERS AND END CAPS FOR CORRUGATED POLYETHYLENE PIPE SHALL DEMONSTRATE THEY ARE WATER TIGHT AS PER AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, DIVISION II, SECTION 26 COUPLINGS SHALL BE ANY OF THE FOLLOWING:
  - BELL/SPIGOT OR BELL/BELL JOINT HAVING AN INTERNAL ELASTOMERIC SEAL MEETING THE REQUIREMENTS OF ASTM F-477.
  - SPLIT COUPLING BANDS WITH A NEOPRENE GASKET, WHICH SHALL LAP EQUALLY ON EACH OF THE PIPES BEING CONNECTED TO FORM A TIGHTLY CLOSED JOINT AFTER INSTALLATION. SPLIT COUPLING BAND SHALL ONLY BE ALLOWED FOR REPAIR APPLICATIONS, THE CORRUGATIONS IN THE COUPLING BAND SHALL INDEX THE CORRUGATIONS ON THE PIPE ENDS TO ENGAGE A MINIMUM OF TWO CORRUGATIONS ON EACH END JOINT.
- 3- TYPE D OR S MAY BE USED:
  - TYPE S: THIS PIPE WILL HAVE A FULL CIRCULAR CROSS-SECTION, WITH AN OUTER CORRUGATED PIPE WALL AND A SMOOTH INNER LINER.
  - TYPE D: THIS PIPE SHALL CONSIST OF AN ESSENTIALLY SMOOTH WATERWAY BRACED CIRCUMFERENTIALLY WITH CIRCULAR RIBS, WHICH ARE FORMED SIMULTANEOUSLY WITH AN ESSENTIALLY SMOOTH OUTER WALL.
- 4- POLYETHYLENE PIPES WILL NEVER BE INSTALLED IN THE POSITIVE PROJECTION OR THE INDUCED TRENCH METHOD.
- 5- MAXIMUM ALLOWABLE DEFLECTION OF POLYETHYLENE PIPE SHALL BE 5.0%. FOR POLYETHYLENE PIPES WHICH SHOW QUESTIONABLE DEFLECTION, THE ENGINEER SHALL REQUIRE FROM THE CONTRACTOR A MANDREL TEST. THIS TEST WILL BE A SUBSIDIARY OBLIGATION. PIPES WHICH FAIL THE MANDREL TEST SHALL BE REPAIRED OR REPLACED AT CONTRACTOR'S EXPENSE.
- 6- MINIMUM COVER FOR H30 WHEEL LOADS SHALL BE 0.30M, INCLUDING PAVEMENT SECTION. MINIMUM COVER OF FILL OVER THE CROWN OF THE PIPE OF 0.90 M SHALL BE PROVIDED BEFORE ANY HEAVY CONSTRUCTION EQUIPMENT IS PERMITTED ACROSS THE INSTALLATION.
- 7- TRENCH WIDTHS INDICATED ASSUMES THE PIPE WILL BE INSTALLED IN COMPETENT NATIVE OR EMBANKMENT MATERIAL. IF POOR SOIL CONDITIONS ARE ENCOUNTERED, THE WIDTHS INDICATED SHALL BE INCREASED AS DIRECTED BY THE ENGINEER.
- 8- HAUNCHING MATERIAL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 0.150 M IN COMPACTED THICKNESS.
- 9- CONNECTIONS TO EXISTING PVC OR CONCRETE PIPE SHALL BE ACCOMPLISHED BY USING FERNCO COUPLERS OR APPROVED EQUAL.
- 10- BEDDING AND HAUNCHING MATERIALS SHALL BE CONSIDERED AS SUBSIDIARY OBLIGATION OF THE PEP PIPE.
- 11- CLASS A BEDDING SHALL BE USED WHEN H <= 0.30 M.

EFFECTIVE DATE: JULY 2000

COMMONWEALTH OF PUERTO RICO  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC WORKS  
HIGHWAY AND TRANSPORTATION AUTHORITY

**POLYETHYLENE (PE) PIPE  
INSTALLATION METHOD**  
NEGATIVE PROJECTION AND  
TRENCH METHOD

RECOMMENDED BY: *[Signature]*  
DESIGN AREA DIRECTOR  
DATE: *May 7, 2000*

APPROVED BY: *[Signature]*  
EXECUTIVE DIRECTOR  
DATE: *May 19, 2000*

DATE	REVISION	BY
8-5-99	ADD PIPE 54" & 60" DIAMETER	LV.
3-2000	GENERAL REVISION	LV.

STD. DWG. PEP 1 OF 2