

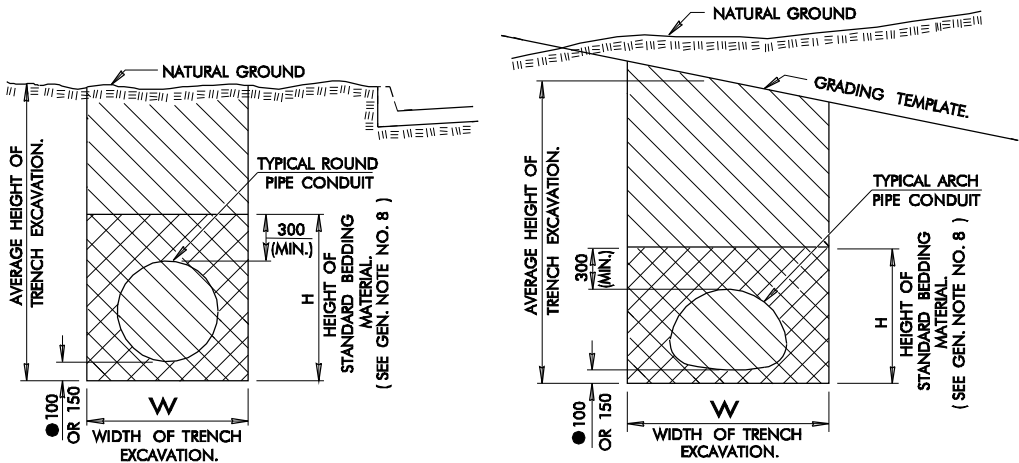
TABLE OF TRENCHING AND
STANDARD BEDDING MATERIAL QUANTITIES

	PIPE DIAM. OR DESIGN EQUIV.			SINGLE PIPE INSTALLATION		DOUBLE PIPE INSTALLATION		TRIPLE PIPE INSTALLATION		CLEAR SPACE BETWEEN PIPES
				W	STANDARD BEDDING MATERIAL	W	STANDARD BEDDING MATERIAL	W	STANDARD BEDDING MATERIAL	
		H	W	mm	m ³ /m	mm	m ³ /m	mm	m ³ /m	
ROUND PIPE	450	18	945	975	0.72	1890	1.37	2805	2.24	355
	600	24	1100	1220	0.99	2365	1.89	3505	3.15	430
	750	30	1280	1465	1.31	2835	2.50	4205	4.26	510
	900	36	1435	1675	1.61	3275	3.10	4875	5.39	585
	1050	42	1585	2135	2.27	3965	4.07	5790	6.96	660
	1200	48	1740	2285	2.56	4345	4.73	6400	8.31	735
	1350	54	1890	2440	3.13	4725	5.97	7010	10.29	815
	1500	60	2045	2895	4.09	5410	7.40	7925	12.54	890
	1650	66	2225	3050	4.58	5790	8.47	8535	14.57	965
METAL ARCH PIPE	450	18	855	1100	0.79	2090	1.48	3080	2.18	355
	600	24	990	1370	1.09	2620	2.05	3860	3.02	430
	750	30	1100	1675	1.42	3175	2.65	4675	3.87	510
	900	36	1220	1905	1.72	3660	3.25	5410	4.78	585
	1050	42	1340	2135	2.03	4140	3.90	6145	5.76	660
	1200	48	1465	2470	2.53	4755	4.80	7040	7.07	735
	1350	54	1600	3020	3.46	5560	6.16	8100	8.86	815
	1500	60	1705	3200	3.78	5995	6.87	8790	9.95	890
	1650	66	1830	3320	4.04	6345	7.53	9370	11.03	965

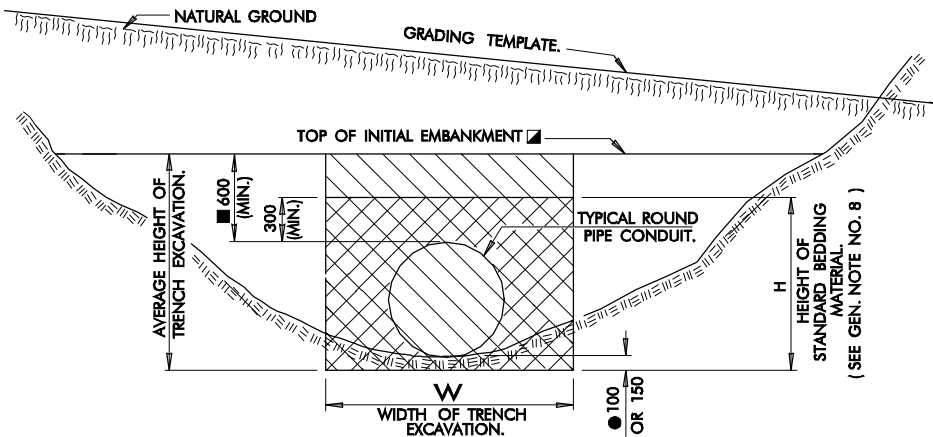
TABLE OF FILL HEIGHTS

PIPE SIZE		MINIMUM COVER OVER TOP OF PIPE (BUOYANCY)	MAXIMUM COVER		MINIMUM METAL PIPE GAGE REQUIREMENT		
POLYETH. ROUND	EQUIVALENT METAL ARCH		POLYETHYLENE	METAL	UNDER PAVEMENT		ALL OTHERS
mm IN.	mm x mm	mm IN.	m	m	GAGE	mm	
450 18	510 x 380	375 15	3.0	REFER TO RDY. STANDARD FHTMP-4	14	2.00	REFER TO RDY. STANDARD FHTMP-4
600 24	680 x 500	500 20	3.0		14	2.00	
750 30	910 x 660	625 25	3.0		14	2.00	
900 36	1030 x 740	750 30	3.0		14	2.00	
1050 42	1150 x 820	875 35	3.0		12	2.75	
1200 48	1390 x 970	1000 40	3.0		12	2.75	
1350 54	1630 x 1120	1125 45	N/A		12	2.75	
1500 60	1800 x 1200	1250 50	N/A		10	3.50	
1650 66	1950 x 1320	1375 55	N/A		10	3.50	

- UNDER PAVEMENT IS DEFINED TO INCLUDE ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS.
A MINIMUM METAL PIPE GAGE OF 16 MAY BE USED FOR INSTALLATIONS REQUIRING 750 mm EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.



TRENCH EXCAVATION IN CUT SECTIONS



TRENCH EXCAVATION IN EMBANKMENT SECTIONS

- TO BE COMPACTED IN ACCORDANCE WITH SUBSECTION 202.04(C) OF THE 1999 METRIC STANDARD SPECIFICATIONS.
● EQUIVALENT PIPE SIZES 1650 mm AND LARGER REQUIRE 150 mm OF BEDDING MATERIAL BELOW PIPE CONDUIT.

- LIMITS OF STANDARD BEDDING MATERIAL.
QUANTITIES FOR BEDDING MATERIAL DO NOT INCLUDE THE SPACE WITHIN AND BOUNDED BY THE OUTER SURFACE OF THE PIPE CONDUIT.
■ LIMITS OF TRENCH EXCAVATION.

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 1999 METRIC STANDARD SPECIFICATIONS.
- TRENCH EXCAVATION & STANDARD BEDDING QUANTITIES WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS ON SIDE DRAINS UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- TRENCH EXCAVATION WILL BE PAID FOR ON PIPE UNDERDRAIN. SEE 1999 METRIC ROADWAY STANDARD DRAWING PUD-3.
- TRENCHING REQUIREMENTS FOR DEPTHS OVER 1.5 METERS SHALL BE IN ACCORDANCE WITH, & DEFINED BY O.S.H.A. REGS., TITLE 29 CFR, STANDARDS 1926.650, 1926.651 & 1926.652.
- NORMAL BACKFILLING OPERATIONS SHALL FOLLOW BEDDING AND PIPE INSTALLATION AS CLOSELY AS PRACTICAL. IN NO CASE SHALL A PIPE INSTALLATION, SUBJECT TO SUDDEN FLOW DEVELOPMENT, BE LEFT WITHOUT SUFFICIENT BACKFILL TO RESTRAIN THE CONDUIT AND PREVENT JOINT SEPARATION AND/OR PIPING SCOUR. PHYSICALLY RESTRAINING THE CONDUIT MAY BE USED TO AUGMENT OR REPLACE THIS IMMEDIATE BACKFILL REQUIREMENT.
- ANY EXCESS EXCAVATION NOT USED FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF, BY HIM, IN A MANNER APPROVED BY THE ENGINEER.
- INSTALLATION OF FLEXIBLE PIPE SHALL CONFORM TO SECTION 26 - DIVISION II OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.
- STANDARD BEDDING MATERIAL SHALL BE PLACED IN 150 mm LAYERS AND COMPACTED TO THE SPECIFIED DENSITY USING HAND OPERATED EQUIPMENT ONLY. FOR POLYETHYLENE PIPE INSTALLATIONS UNDER PAVEMENT (P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS) BEDDING MATERIAL SHALL CONSIST OF FLOWABLE FILL ALL THE WAY TO THE OUTSIDE TOP OF THE PIPE WALL. THE REMAINDER OF THE BEDDING LIMITS WILL CONSIST OF STANDARD BEDDING MATERIAL.
- JOINTS IN METAL PIPES SHALL BE SOILTIGHT AND CONFORM TO SECTION 26.4.2.4 OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES. IF A WATERTIGHT JOINT IS SPECIFIED ON THE PLANS, A 300 mm WIDE BY 19 mm THICK NEOPRENE SLEEVE GASKET MEETING THE REQUIREMENTS OF ASTM D-1056 SHALL BE USED.
- JOINTS IN CORRUGATED POLETHYLENE PIPES SHALL CONSIST OF A GASKETED SYSTEM WHICH CAN PASS MINIMUM OF 13.8 mPa HYDROSTATIC TEST WITHOUT LEAKKAGE AND CONFORM TO AASHTO M 294 ▲ & SECTION 26.4.2.4 OF AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES. GASKET MATERIAL SHALL CONFORM TO EITHER ASTM D1056 OR ASTM F477 REQUIREMENTS. SIDE DRAINS ARE EXCLUDED FROM THE LEAKAGE RESISTANCE REQUIREMENTS UNLESS OTHERWISE SPECIFIED.
- TYPE C POLYETHYLENE PIPE SHALL BE USED ONLY IN SIDE-DRAIN & SLIPLINE APPLICATIONS.
- 12. STANDARD BEDDING MATERIAL QUANTITIES BASED ON TRENCH WIDTH (W), TRENCH HEIGHT (H) AND EFFECTIVE DIAMETER (D) OF ROUND CORRUGATED POLYETHYLENE PIPE MEETING REQUIREMENTS OF AASHTO M 294 (450 mm - 900 mm) AND AASHTO MP6-95 (1050 mm - 1200 mm).
- ▲ 13. SPLIT COLLAR COUPLERS ARE NOT APPROVED FOR USE IN ALL CORRUGATED POLYETHYLENE PIPE INSTALLATIONS.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613	DRAINAGE PIPE	METER
613.06(5)	TRENCH EXCAVATION	CUBIC METER
613.06(T)	STANDARD BEDDING MATERIAL	CUBIC METER

APPROVED BY ROADWAY ENGINEER
OKLAHOMA DEPT. OF TRANSPORTATION
DIVISION STANDARD (METRIC)

FLEXIBLE PIPE INSTALLATION