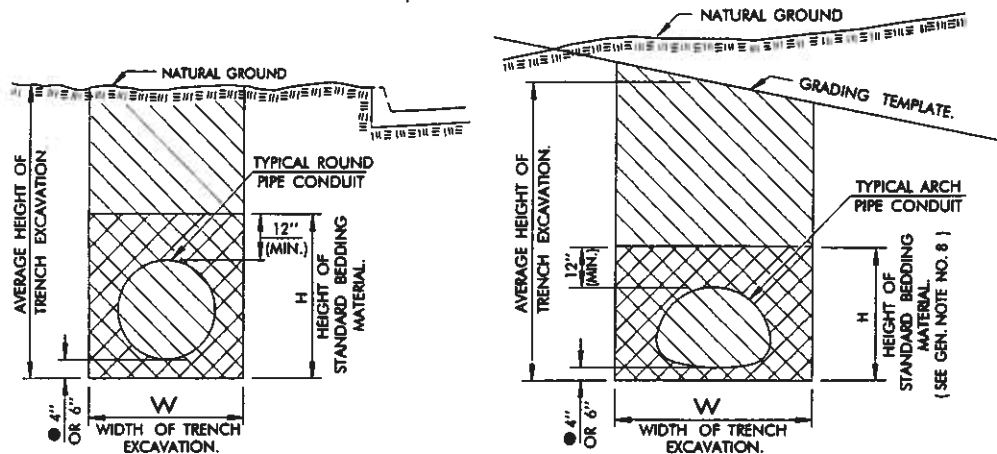


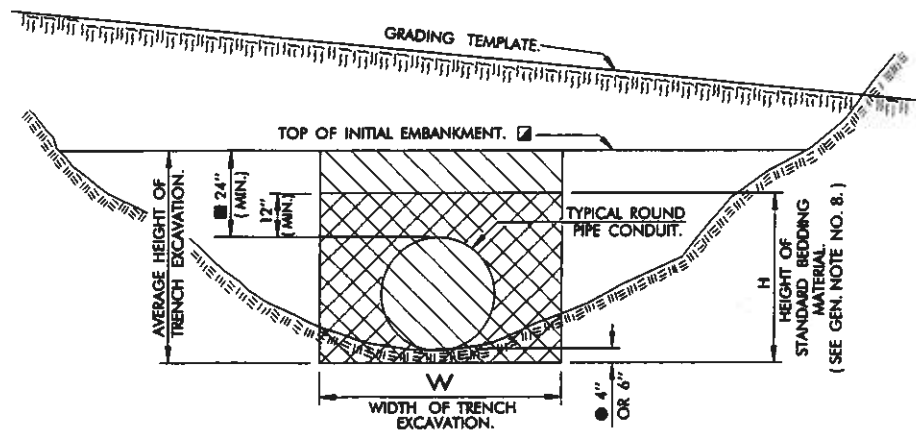
DESCRIPTION	REVISIONS	DATE
RE-ISSUE W/ENGLISH 1999 SPECS.		7/99
Pipe Spacing Units, Fill Table Titles		1/03
Add Pipe Size, Rev. Gen. Note #8		1/07

**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	
		H	W	W	W	W	W		
		FT.	FT.	FT.	FT.	FT.	FT.		
BE ROUND PIPE	18	3.10	3.20	0.28	6.10	0.52	9.00	1.00	14
	24	3.60	4.00	0.39	7.70	0.73	11.40	1.50	17
	30	4.20	4.80	0.51	9.30	0.97	13.80	2.15	20
	36	4.75	5.50	0.63	10.80	1.23	16.20	2.85	23
	42	5.30	7.00	0.92	13.20	1.67	19.30	3.80	26
	48	6.20	7.50	1.03	14.75	2.00	21.70	4.70	29
	54	6.20	8.00	1.20	15.30	2.20	22.70	5.10	32
	60	6.75	9.50	1.60	17.60	2.75	25.90	6.30	35
	66	7.20	10.00	1.70	18.80	3.10	27.70	7.35	38
	METAL ARCH PIPE	18	2.80	3.20	0.27	6.20	0.52	9.20	0.77
24		3.25	4.00	0.38	7.83	0.74	11.67	1.09	17
30		3.60	5.50	0.57	10.20	1.03	14.87	1.49	20
36		4.00	6.25	0.69	11.75	1.27	17.25	1.84	23
42		4.40	7.00	0.82	13.33	1.53	19.66	2.24	26
48		4.80	8.10	1.02	15.35	1.88	22.60	2.75	29
54		5.25	9.50	1.32	17.58	2.36	25.66	3.40	32
60		5.60	10.00	1.40	18.92	2.62	27.84	3.82	35
66		6.00	10.90	1.63	20.65	3.00	30.40	4.39	38



**TRENCH EXCAVATION IN CUT SECTIONS**



**TRENCH EXCAVATION IN EMBANKMENT SECTIONS**

- ☑ TO BE COMPACTED IN ACCORDANCE WITH SUBSECTION 202.04(C) OF THE 1999 ENGLISH STANDARD SPECIFICATIONS.
- EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES 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.

**TABLE OF FILL HEIGHTS**

PIPE SIZE (IN.)	MINIMUM COVER OVER TOP OF PIPE (BUOYANCY) (IN.)		MAXIMUM COVER (FT.)		MINIMUM METAL PIPE GAGE REQUIREMENT	
	POLYETH. ROUND	EQUIVALENT METAL ARCH	POLYETHYLENE	METAL	UNDER PAVEMENT	ALL OTHERS
18	21 x 15	15	10	REFER TO RDY. STANDARD FHTMP-4	14	REFER TO RDY. STANDARD FHTMP-4
24	28 x 20	20	10		14	
30	35 x 24	25	10		14	
36	42 x 29	30	10		14	
42	49 x 33	35	10		12	
48	57 x 38	40	10		12	
54	64 x 43	45	10		12	
60	71 x 47	50	10		10	
66	77 x 52	55	N/A		10	

● UNDER PAVEMENT IS DEFINED TO INCLUDE ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS. A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATION REQUIRING 30 INCH 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.

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 1999 ENGLISH STANDARD SPECIFICATIONS.
  2. TRENCH EXCAVATION & STANDARD BEDDING WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS ON SIDE DRAINS UNLESS OTHERWISE SPECIFIED ON THE PLANS.
  3. TRENCH EXCAVATION WILL BE PAID FOR ON PIPE UNDERDRAIN. SEE 1999 ENGLISH ROADWAY STANDARD DRAWING PUD-3.
  4. TRENCHING REQUIREMENTS FOR DEPTHS OVER 5 FEET SHALL BE IN ACCORDANCE WITH, & DEFINED BY, O.S.H.A. REGS., TITLE 29 CFR, STANDARDS 1926.650, 1926.651 & 1926.652.
  5. 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.
  6. 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.
  7. INSTALLATION OF FLEXIBLE PIPE SHALL CONFORM TO SECTION 26 - DIVISION II OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.
  8. BEDDING MATERIAL SHALL BE PLACED IN 6" 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, PLUS 12 INCHES. THE REMAINDER OF THE BEDDING LIMITS WILL CONSIST OF STANDARD BEDDING MATERIAL.
  9. JOINTS IN METAL PIPES SHALL CONFORM TO SECTION 26.4.2.4 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES. IF A WATERTIGHT JOINT IS SPECIFIED ON THE PLANS, A 12" WIDE BY 3/4" THICK NEOPRENE SLEEVE GASKET MEETING ASTM D-1056 REQUIREMENT SHALL BE USED.
  10. JOINTS IN CORRUGATED POLYETHYLENE PIPES SHALL CONSIST OF A GASKETED SYSTEM WHICH CAN PASS MINIMUM OF 2 PSI HYDROSTATIC TEST WITHOUT LEAKAGE AND CONFORM TO AASHTO M294 & 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.
  11. TYPE C POLYETHYLENE PIPE SHALL BE USED ONLY IN SIDE-DRAIN & SUIPLINING APPLICATIONS.
  - ☑ 12. STANDARD BEDDING MATERIAL QUANTITIES ARE BASED ON THE TRENCH WIDTH (W), TRENCH HEIGHT (H) AND EFFECTIVE DIAMETER (D) OF ROUND CORRUGATED POLYETHYLENE PIPE MEETING THE REQUIREMENTS OF AASHTO M 294 (18"-36") & AASHTO MP6-95 (42"-60").
  - ▲ 13. SPLIT COLLAR COUPLERS ARE NOT APPROVED FOR USE IN ALL CORRUGATED POLYETHYLENE PIPE INSTALLATIONS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613.06	DRAINAGE PIPE	L. F.
613.06(S)	TRENCH EXCAVATION	C. Y.
613.06(T)	STANDARD BEDDING MATERIAL	C. Y.

☑ SEE AVAILABLE PIPE OPTIONS IN SECTION 613 OF THE 1999 ENGLISH STANDARD SPECIFICATIONS.

APPROVED BY ROADWAY ENGINEER *Timothy A. Pogoda* DATE 3/1/07

**OKLAHOMA DEPT. OF TRANSPORTATION**  
**ROADWAY STANDARD (ENGLISH)**  
**FLEXIBLE PIPE INSTALLATION**

1999 SPECIFICATIONS FPI-2 OZE  
R-74BE