

LEGEND	
D	= DIAMETER
	STANDARD BEDDING MATERIAL COMPACTED IN 6" LAYERS 95% MAXIMUM DENSITY
	SUITABLE FOUNDATION, FREE OF DEBRIS OR LOOSE SOIL
	MIDDLE BEDDING, LOOSELY PLACED, UNCOMPACTED
	OUTER BEDDING COMPACTED TO 95% MAXIMUM DENSITY

APPROXIMATE ANGLE OF REPOSE FOR SLOPING SIDES OF EXCAVATIONS IN TRENCHES WITH DEPTH GREATER THAN 5 FEET AND LESS THAN 20 FEET, AS A METHOD TO PROTECT PERSONNEL WORKING IN EXCAVATIONS FROM CAVE-INS. ♦

NOTE: THE PRESENCE OF GROUND WATER REQUIRES SPECIAL TREATMENT.

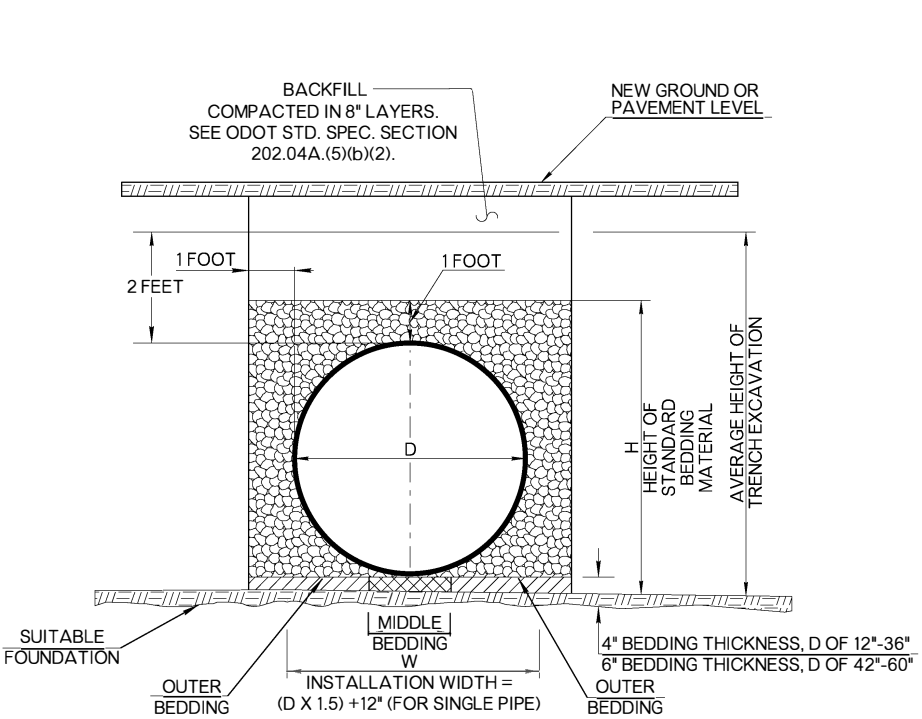
TYPE A SOIL: 1: 3/4 (63°)
 TYPE B SOIL: 1: 1 (45°)
 TYPE C SOIL: 1: 1/2 (34°)

OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET

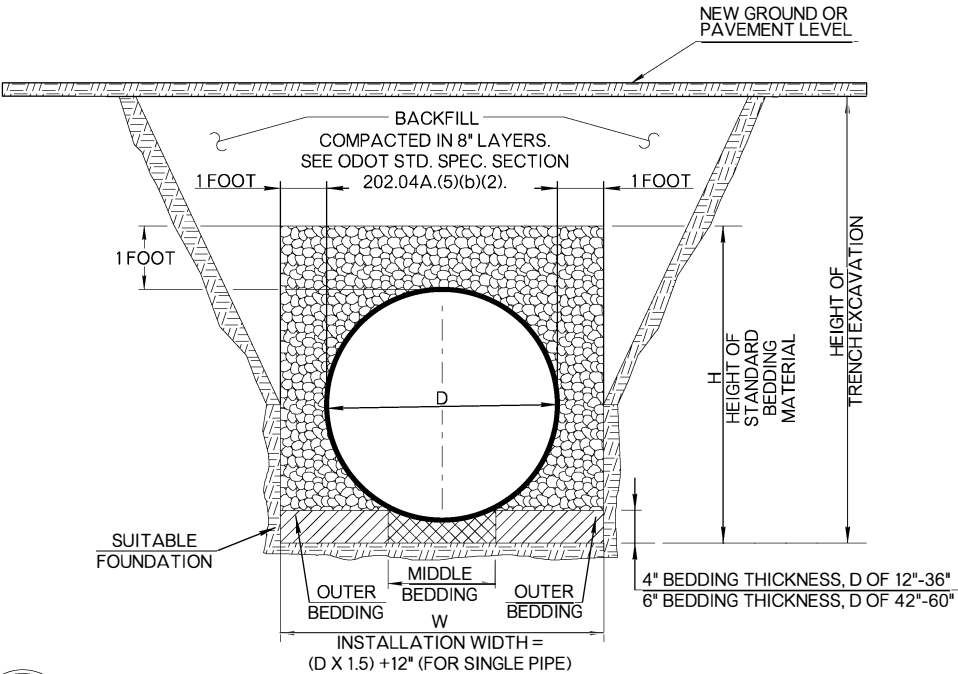
EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF TRENCHED WALLS WERE VERTICAL. (SPECIAL TRENCHING=STD. WIDTH TRENCH + 12 INCHES)

▼ NATURAL SOLID MINERAL MATTER THAN CAN BE EXCAVATED WITH VERTICAL SIDES AND REMAIN INTACT WHILE EXPOSED.

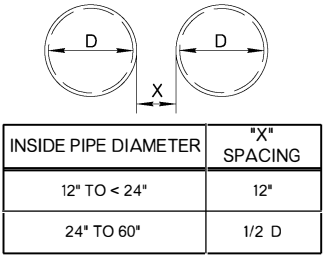
♦ SOIL CLASSIFICATION - SOIL AND ROCK DEPOSITS SHALL BE CLASSIFIED IN ACCORDANCE WITH APPENDIX A UNDER SUBPART P "EXCAVATIONS" OF 29 CFR 1926.



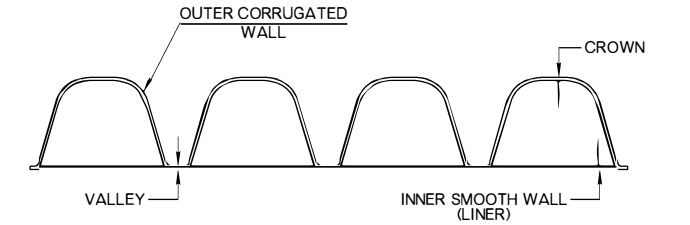
EMBANKMENT INSTALLATION
(INSTALLATION ON OR ABOVE EXISTING GROUND)



TRENCH INSTALLATION
(INSTALLATION BELOW EXISTING GROUND)



MULTIPLE PIPE INSTALLATION



"DUAL WALL" TYPE S CONFIGURATION

FOR CORRUGATED HIGH-DENSITY POLYETHYLENE (HDPE) AND CORRUGATED POLYPROPYLENE (PP) PIPES

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2019 ODOT STANDARD SPECIFICATIONS.
- BOTH THE CORRUGATED POLYPROPYLENE (PP) AND CORRUGATED POLYETHYLENE (HDPE) PIPES' COVER HEIGHT VALUES ARE BASED ON A HL-93 LIVE LOADING, NO HYDROSTATIC PRESSURE, AND 120 LBS/CF SOIL WEIGHT.
- TRENCHING REQUIREMENTS FOR DEPTHS OVER 5 FEET SHALL BE IN ACCORDANCE WITH AND DEFINED BY, O.S.H.A. REGULATIONS, TITLE 29 CFR, PART 1926, SUBPART P - "EXCAVATIONS", STANDARDS 1926.650, 1926.651 AND 1926.652.
- IN THE EVENT LOADS IN EXCESS OF HL-93 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF 4 FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
- PROPER INSTALLATION PRACTICE MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARD PBB-1 AND AS DESIGNATED IN ASTM D2321. THE PAY ITEMS OF TRENCH EXCAVATION AND STANDARD BEDDING WILL BE REQUIRED FOR THESE PIPES WHEN THEY ARE INSTALLED AS CROSS DRAINS.
- 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 THE CONTRACTOR IN A MANNER APPROVED BY THE ENGINEER.
- JOINTS IN THERMOPLASTIC PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM D3212. SPIGOTS SHALL HAVE WATER TIGHT GASKETS MEETING THE REQUIREMENTS OF ASTM F477.
- FOUNDATION SHALL BE MADE OF STABLE IN-SITU SOIL. IF THE FOUNDATION AREA IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER.
- CORRUGATED HIGH DENSITY POLYETHYLENE PIPE (HDPE) SHALL HAVE A MINIMUM COVER OVER PIPE OF 1 FOOT. THE MINIMUM COVER OVER POLYPROPYLENE PIPE (PP) IS 2 FEET. SEE ROADWAY STANDARD PBB-1 FOR MORE DETAILS OF BOTH PIPES.
- SEGMENTS OF NON-FLAMMABLE PIPE ARE NO LONGER REQUIRED. HOWEVER, METAL OR CONCRETE END TREATMENTS SHALL BE PROVIDED AND PAID FOR AS A SEPARATE PAY ITEM.

CORRUGATED POLYPROPYLENE AND HIGH DENSITY POLYETHYLENE PIPES									
STANDARD BEDDING MATERIAL QUANTITIES									
PIPE DIAM. (D)	H STD BED. MAT. ■	SINGLE PIPE		DOUBLE PIPE		TRIPLE PIPE		CLEAR SPACE BETWEEN PIPES ▲	SPACE BETWEEN PIPE AND TRENCH WALL
		W WIDTH	STANDARD BEDDING MATERIAL ■	W WIDTH	STANDARD BEDDING MATERIAL ■	W WIDTH	STANDARD BEDDING MATERIAL ■		
IN.	FT.	FT.	CY/LF	FT.	CY/LF	FT.	CY/LF	FEET	FEET
12	2.33	2.50	0.19	5.00	0.37	7.00	0.52	1.00	1.00
15	2.58	2.88	0.23	5.50	0.44	7.75	0.61	1.00	1.00
18	2.83	3.25	0.28	6.00	0.50	8.50	0.70	1.00	1.00
24	3.33	4.00	0.38	7.00	0.63	10.00	0.89	1.00	1.00
30	3.83	4.75	0.49	8.25	0.81	12.00	1.16	1.25	1.00
36	4.33	5.50	0.62	9.50	1.00	14.00	1.46	1.50	1.00
42	4.83	6.25	0.76	10.75	1.21	16.00	1.80	1.75	1.00
48	5.33	7.00	0.92	12.00	1.44	18.00	2.16	2.00	1.00
60	6.33	8.50	1.27	15.00	2.06	22.50	3.10	2.50	1.25

- HEIGHT OF STD BEDDING MATERIAL INCLUDES THE BEDDING UNDER PIPE, THE NOMINAL DIAMETER OF THE PIPE, AND 12 INCHES ABOVE TOP OF PIPE.
- FOR PIPES UNDER PAVEMENT, THE H DIMENSION AND THE STANDARD BEDDING MATERIAL QUANTITY SHALL BE INCREASED TO GO TO THE PAVEMENT. SEE ROADWAY STANDARD PBB-1.
- ▲ SEE MULTIPLE INSTALLATIONS TABLE.

ALLOWABLE PIPE SIZES	
CORRUGATED HIGH DENSITY POLYETHYLENE PIPE, TYPE S (HDPE) ■	CORRUGATED POLYPROPYLENE PIPE, TYPE S (PP) ■
AASHTO M 294	AASHTO M 330
ASTM F2306	ASTM F2881
DIAMETER (INCHES)	DIAMETER (INCHES)
12	12
15	15
18	18
24	24
30	30
36	36
42	42
48	48
60	60

■ SEE "DUAL WALL" TYPE S CONFIGURATION DETAIL

MINIMUM AND MAXIMUM HEIGHT OF COVER FOR CORR. HIGH DENSITY POLYETHYLENE (HDPE) AND CORR. POLYPROPYLENE (PP) PIPES ●				
PIPE DIAMETER	MIN. HT. OF COVER		MAX. HT. OF COVER	
	HDPE	PP	HDPE	PP
INCHES	FEET	FEET	FEET	FEET
12	1	2	29	32
15	1	2	26	30
18	1	2	26	25
24	1	2	24	25
30	1	2	24	25
36	1	2	24	24
42	1	2	23	23
48	1	2	23	21
60	1	2	23	21

● MINIMUM COVER DEPTH IS TAKEN FROM AASHTO LRFD BRIDGE DESIGN SPEC. 12.6.6.3, AND THE MAXIMUM COVER DEPTH IS TAKEN FROM PLASTIC PIPE INSTITUTE'S HANDBOOK, CHAPTER 7.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (E)	CORRUGATED POLYETHYLENE PIPE	LF
613 (EE)	CORRUGATED POLYPROPYLENE PIPE	LF
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (V)	TRENCH EXCAVATION	CY

APPROVED BY ROADWAY ENGINEER:

DATE: 12/20/2024

ROADWAY DESIGN DIVISION STANDARD

THERMOPLASTIC CULVERT INSTALLATION

2019 SPECIFICATIONS

OKLAHOMA Transportation

TCI-1 0

R-62