

- NOTES:
- WHERE THE TRENCH BOTTOM IS IN ROCK, IT SHALL BE EXCAVATED TO A MINIMUM OF 8" BELOW THE BOTTOM OF THE PIPE AND BACKFILLED WITH BEDDING MATERIAL.
 - WHERE PIPE FOUNDATIONS ARE YIELDING, PIPE SHALL BE BEDDED ON A MINIMUM OF 8" BEDDING MATERIAL.
 - FOR PIPE LESS THAN 12" THE TRENCH WIDTH MAY BE 36" MAXIMUM.

SEWER BEDDING DETAIL
NOT TO SCALE

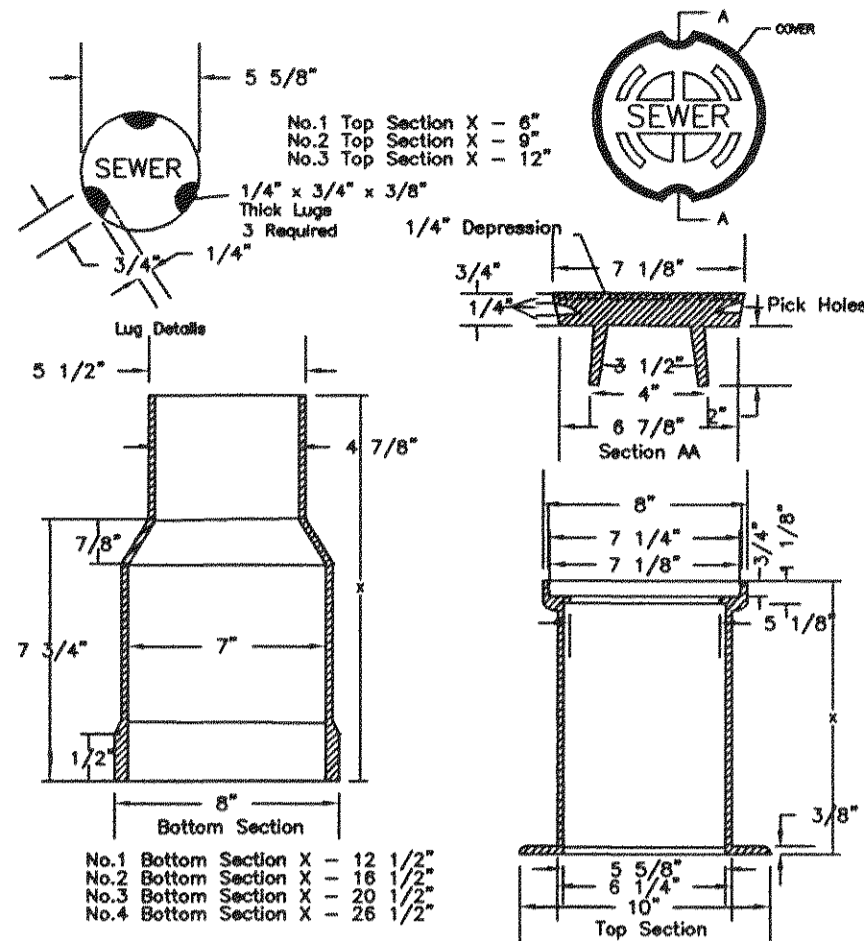
Pipe Diameter (in.)	Min. Time (min/sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Specified Time for Length (L) Shown (min/sec)								
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24	
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	
10	9:28	239	2.374 L	9:28	9:28	9:28	9:53	11:52	13:51	15:49	17:48	
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	
21	19:50	114	10.470 L	19:50	28:10	34:54	43:37	52:21	61:00	69:48	78:31	
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	
30	28:20	80	21.368 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	

MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015.

SANITARY SEWER AIR PRESSURE TEST
NOT TO SCALE

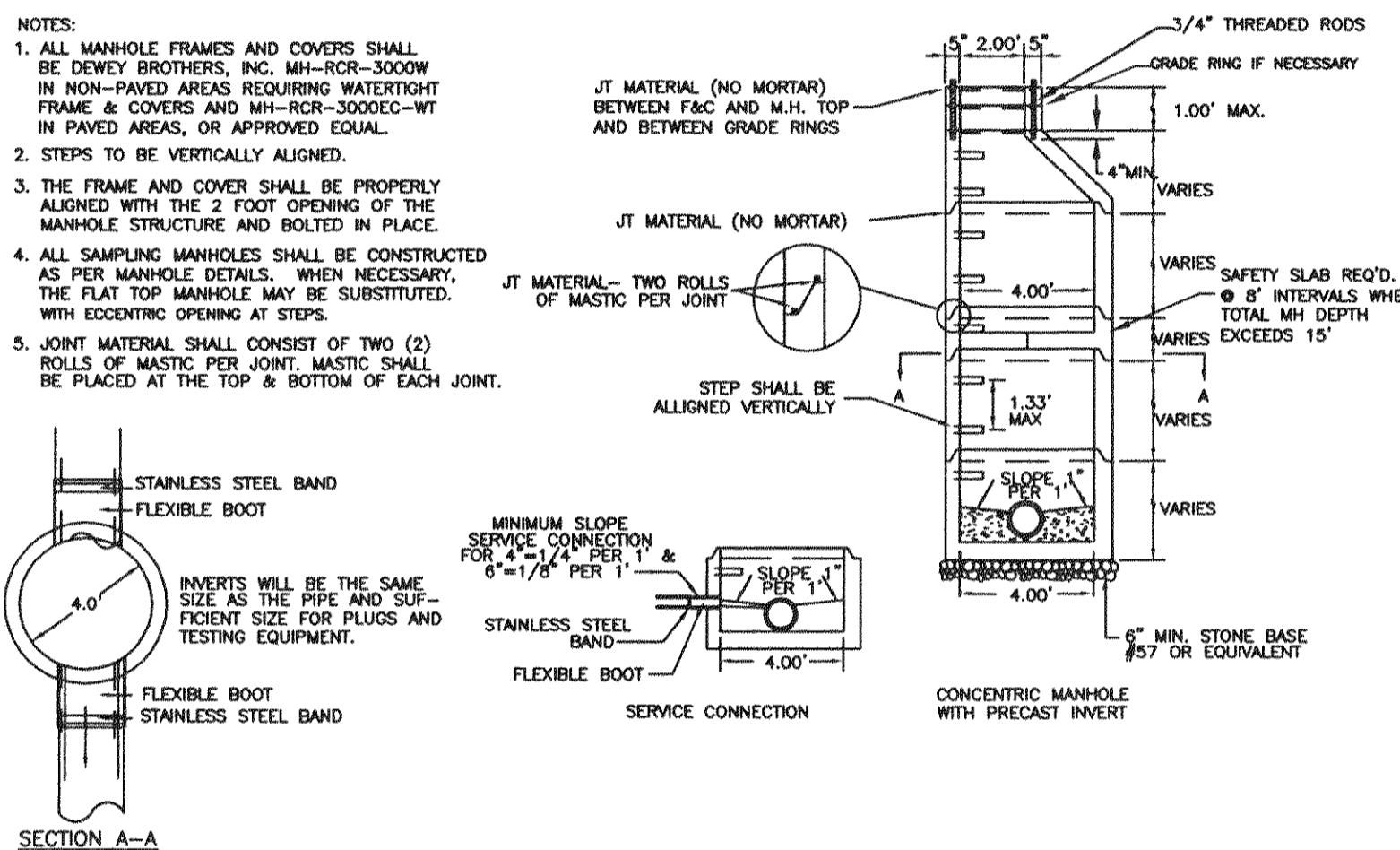
- PIPE & FITTINGS:** ALL SANITARY SEWER PIPE AND FITTINGS SHALL BE POLYVINYL CHLORIDE (PVC), SDR 35, AND SHALL CONFORM WITH ASTM D-3034.
- INSTALLATION:** THE SANITARY SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS AND THESE SPECIFICATIONS. THE PIPE SHALL BE LAID IN TRUE STRAIGHT LINES WITH THE BALL ENDS UPSTREAM AND WITH THE INVERT OF THE PIPE BEING THE TRUE ELEVATION AND GRADE OF THE SYSTEM. THE PIPE SHALL BE VISUALLY INSPECTED FOR DEFECTS BEFORE LOWERING THE PIPE IN THE TRENCH. FIELD CUTTING OF THE PIPE SHALL BE DONE SO IN A NEAT AND WORKMANLIKE MANNER, SO AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE.
- TRENCH EXCAVATION:** TRENCHES SHALL BE EXCAVATED IN STRAIGHT LINES AND SHALL BE OF SUFFICIENT WIDTH TO PERMIT THE PROPER INSTALLATION OF BRACING, SHORING OR SHEETING. TRENCH WIDTH SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. THE BOTTOM OF THE PIPE TRENCH SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF FOUR (4) INCHES BELOW THE BOTTOM OF THE PIPE, TO PROVIDE FOR THE COMPACTED BEDDING MATERIAL.
- BEDDING:** BEDDING MATERIAL SHALL BE COARSE AGGREGATE SIZE NUMBER 57 AND SHALL CONFORM WITH VDOT SECTION 203 AND/OR ASTM C33. BEDDING MATERIAL SHALL BE PLACED AND COMPACTED IN FOUR (4) INCHES BELOW THE PIPE AND AS A MINIMUM UP TO THE SPRINGLINE OF THE PIPE. CARE SHALL BE TAKEN TO ENSURE THE BEDDING MATERIAL FULLY SUPPORTS THE SIDE AND BOTTOM OF THE PIPE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- BACKFILL:** BACKFILL MATERIAL SHALL BE EITHER APPROVED EXCAVATED MATERIAL OR APPROVED SUITABLE MATERIAL FROM OTHER SOURCES THAT IS FREE OF ORGANIC MATERIAL, LOAM, DEBRIS, OR MINIMUM ONE (1) FOOT ABOVE THE TOP OF PIPE SHALL BE FREE OF STONES LARGER THAN TWO (2) INCHES AND SHALL BE PLACED IN SIX (6) INCH LAYERS AND COMPACTED WITH HAND TAMPERS. BACKFILL FROM THIS POINT TO TOP OF TRENCH SHALL BE FREE OF STONES LARGER THAN FOUR (4) INCHES AND SHALL BE PLACED IN LAYERS NOT TO EXCEED EIGHT (8) INCHES AND COMPACTED WITH MECHANICAL TAMPERS. BACKFILL BELOW UNPAVED AREAS SHALL BE COMPACTED TO 90%. BACKFILL BELOW PAVED AREAS SHALL BE COMPACTED TO 95%. BACKFILL COMPACTION TESTING SHALL BE IN ACCORDANCE WITH ASTM D-1557.
- TESTING OF SANITARY SEWER:** TESTING FOR WATER TIGHTNESS SHALL BE MADE UTILIZING A LOW PRESSURE AIR TEST. THE TESTING EQUIPMENT, PROCEDURE AND RESULTS WILL ALL BE SUBJECT TO THE APPROVAL OF THE COUNTY ENGINEER. THE AIR TEST SHALL BE IN ACCORDANCE WITH ASTM C-828, CURRENT REVISION.
- THE CONTRACTOR SHALL DEFLECTION TEST THE ENTIRE LENGTH OF PIPE BY MEANS OF A GO-NO-GO MANDREL TO ASSURE THAT A 5.0% DEFLECTION HAS NOT BEEN EXCEEDED. MANDREL SHALL BE SIZED AT 5% LESS THAN ASTM DIMENSION FOR THE SEWER.
- A MINIMUM COVER OF THREE (3) FEET IS REQUIRED OVER PROPOSED LINES UNLESS OTHERWISE INDICATED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND UNCOVERING ALL MANHOLES AFTER PAVING. MANHOLE TOPS SHALL BE ADJUSTED TO GRADE IF NECESSARY.
- ALL EXISTING UTILITIES MAY NOT BE SHOWN OR MAY NOT BE SHOWN IN THE EXACT LOCATION. THE CONTRACTOR SHALL COMPLY WITH STATE WATER WORKS REGULATIONS, SECTION 12.05.03, WHERE LINES CROSS.
- LINES SHALL BE STAKED PRIOR TO CONSTRUCTION.

SEWER NOTES

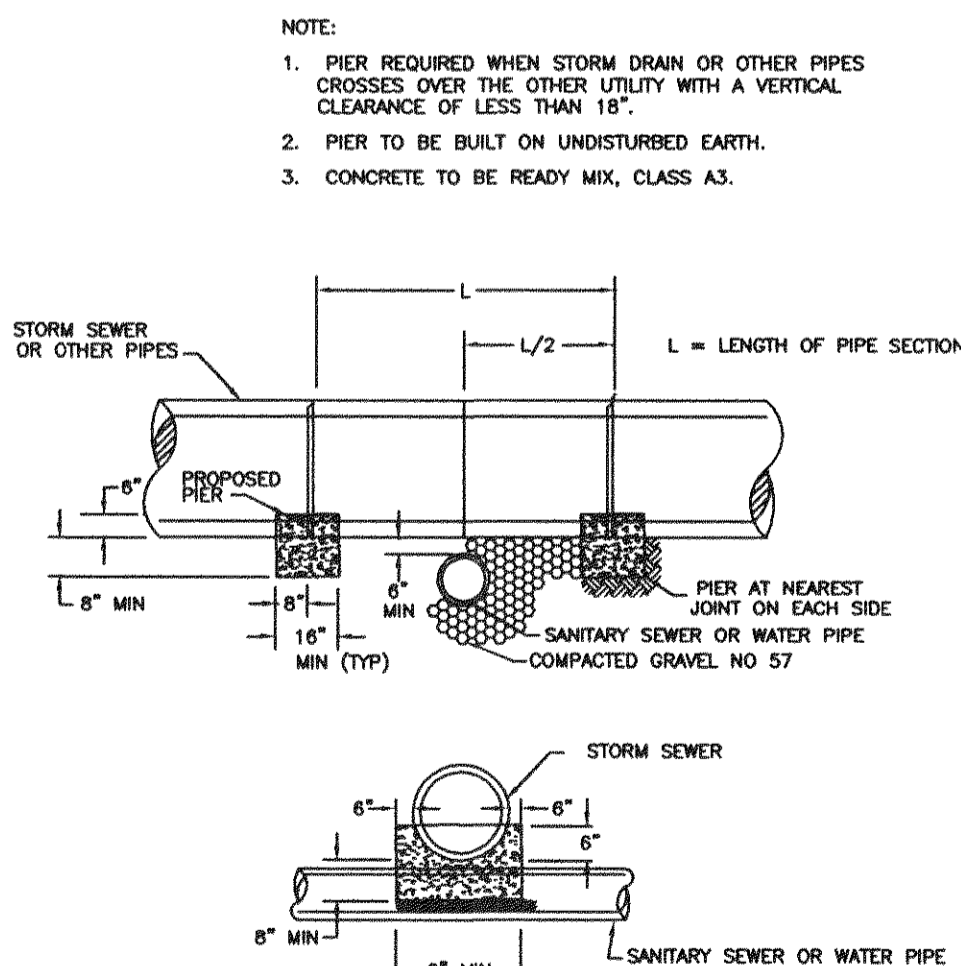


NOTE: A MINIMUM CLEARANCE OF 4 INCHES IS REQUIRED BETWEEN CLEANOUT CAP AND TOP OF COVER.

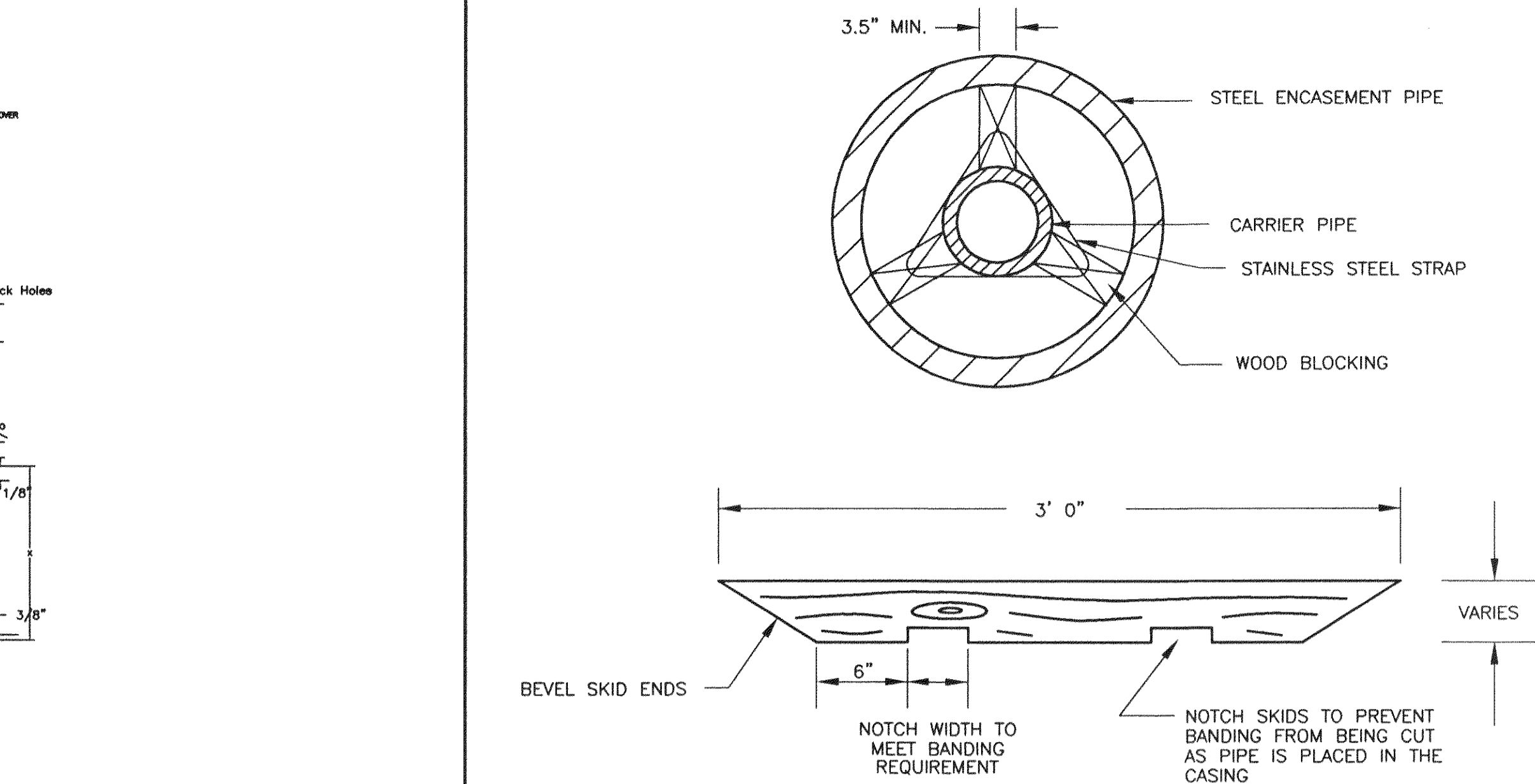
TRAFFIC BEARING CLEANOUT BOX
NOT TO SCALE



STANDARD MANHOLE DETAIL
NOT TO SCALE



CONCRETE PIER
NOT TO SCALE



NOTES:

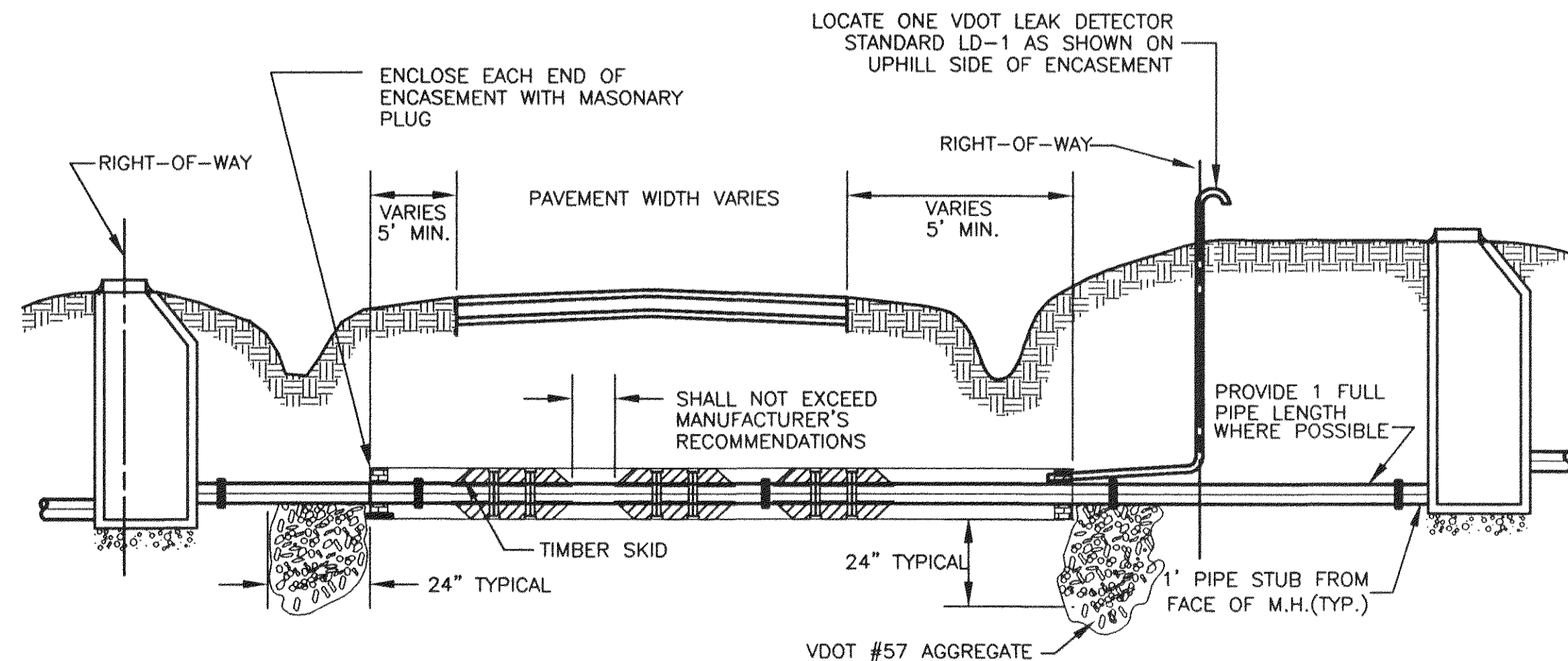
- TIMBER SKIDS SHALL BE LOCUST, CYPRESS, PRESERVATIVE TREATED HARDWOOD, OR OTHER MATERIAL APPROVED BY THE ENGINEER.
- TIMBER PRESERVATIVES SHALL BE USED ACCORDING TO THEIR SUITABILITY FOR THE CONDITION OF EXPOSURE TO WHICH THEY WILL BE SUBJECTED AND SHALL NOT BE USED INTERCHANGEABLY. TREATMENTS SHALL CONFORM TO THE FOLLOWING LIMITATIONS:
 - WATERBORNE PRESERVATIVES SHALL BE USED FOR TIMBER WHERE A CLEAN SURFACE IS DESIRABLE. THE MOISTURE CONTENT OF WOOD MATERIAL SHALL NOT BE MORE THAN 19 PERCENT AT THE TIME OF TREATMENT.
 - PRESERVATIVES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M133 EXCEPT THAT COAL TAR CREOSOTE SOLUTION WILL NOT BE PERMITTED.
 - PRESSURE TREATMENT SHALL CONFORM TO THE REQUIREMENTS OF AWPAC C2.
- METAL STRAPS AND CLIPS HOLDING BLOCKING TO CARRIER PIPE SHALL BE STAINLESS STEEL WITH A MINIMUM CROSS SECTION OF 0.014 SQ. IN. STRAP SPACING SHALL BE A MINIMUM OF TWO (2) BANDS PER SKID LENGTH.

SOURCE: 1993 VDOT ROAD AND BRIDGE STANDARDS SEC. 1404.01

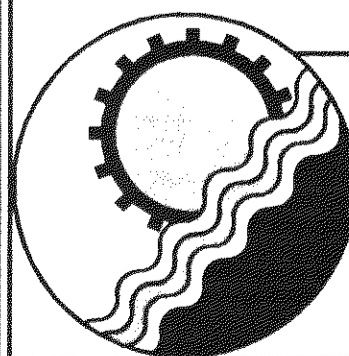
TIMBER SKID
NOT TO SCALE

NOTES:

- SLOPE ENCASEMENT TO MATCH SLOPE OF ENCASED SEWER AS SHOWN ON PLANS.
- STEEL ENCASEMENT PIPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A139 FOR THE CLASS AND THICKNESS SPECIFIED AND SHALL HAVE BEVELED EDGES SUITABLE FOR FIELD WELDING. WALL THICKNESS OF PIPE SHALL BE 1/4" MINIMUM.
- CARRIER PIPE SHALL BE FLANGED DUCTILE IRON.
- CARRIER PIPE SHALL BE LINED WITH TAR PAPER AT MASONRY PLUG.
- MASONRY PLUG SHALL BE OF WATERTIGHT CONNECTION WITH A WEEP HOLE FOR DRAINAGE.
- FOR OPEN CUT INSTALLATIONS:
 - CONTRACTOR SHALL REPLACE CUT MATERIAL WITH APPROVED CRUSHED AGGREGATE AND SHALL ACHIEVE 95% COMPACTION PER VDOT REQUIREMENTS.
 - CONTRACTOR SHALL MATCH EXISTING PAVEMENT CROSS SECTION AND SHALL REPLACE PAVEMENT AND SURFACE TO ORIGINAL CONDITION OR BETTER.
 - CONTRACTOR SHALL FIELD VERIFY LOCATION OF BORE PIT AND CONFIRM WITH ENGINEER BEFORE PROCEEDING WITH ENCASEMENT INSTALLATION.

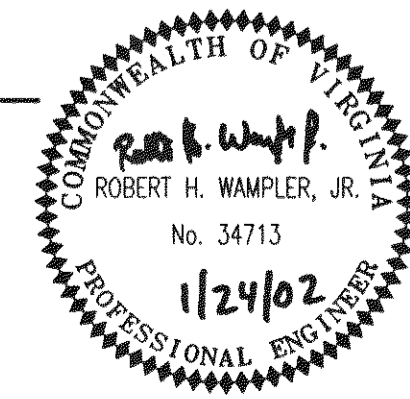


ENCASED ROAD CROSSING
NOT TO SCALE



ENGINEERING CONCEPTS, INC.

20 S. ROANOKE ST., PO BOX 619
FINCASTLE, VIRGINIA 24090
540.473.1253 FAX: 540.473.1254



**SOUTH CENTER DRIVE
AND SANITARY SEWER EXTENSION**

**SANITARY SEWER
DETAILS**

SCALE: AS SHOWN
FEBRUARY 2001
PROJECT: 00144
C9 of C10