CIRCULAR CONCRETE PIPE
EMBANKMENT FILL HEIGHT IN FEET
MEASURED FROM TOP OF PIPE IN FEET, 120 PCF SOIL DENSITY

PIPE CLASS	CLASS II			CLASS III			CLASS IV			CLASS V		
BEDDING / PIPE DIA. (IN.)	A	B	C	A	B	C	A	B	C	A	B	C
12	16	10	8	21	13	11	31	19	16	*	29	24
15	16	10	8	21	13	11	32	19	16	*	30	25
18	16	10	8	21	13	11	32	20	17	*	30	25
21	16	10	8	22	14	12	33	20	17	*	31	25
24	17	10	9	22	14	12	33	21	17	*	31	26
27	17	10	9	22	14	12	33	21	18	*	31	26
30	17	10	9	23	14	12	33	21	18	*	31	26
33	17	11	9	23	14	12	33	21	18	*	31	26
36	17	11	9	23	14	12	34	22	18	*	32	27
42	17	11	9	24	15	12	34	22	18	*	32	27
48	18	11	9	24	15	13	34	22	18	*	32	27
54	18	11	10	24	15	13	35	22	18	*	32	27
60	18	11	10	25	15	13	35	22	18	*	33	27
66	18	11	10	25	15	13	35	22	19	*	33	27
72	19	12	11	25	15	13	35	22	19	*	33	27
78	19	12	11	25	15	13	36	22	19	*	33	27
84	19	12	11	25	15	13	36	22	19	*	33	28
90	19	12	11	25	15	13	36	22	19	*	33	28
96	19	12	11	25	15	13	36	22	19	*	33	28
102	19	13	12	25	15	14	36	22	19	*	33	28
108	19	13	12	25	16	15	36	22	19	*	33	28

FILL HEIGHTS ARE BASED ON A 0.7 SETTLEMENT RATIO
PROJECTION RATIOS
A = 0.7
B = 0.5
C = 0.7
* = FILL HEIGHT GREATER THAN 45', D-LOAD EQUATION MUST BE USED

B = FIRST CLASS BEDDING, MINIMUM OF 6" GRANULAR BEDDING ACCURATELY SHAPED FOR MIN. 60% OF THE PIPE AND 80% FOR ARCH. INITIAL EXCAVATION IS APPROXIMATELY 15% OF THE OUTSIDE DIA. OR RISE OF THE PIPE ABOVE THE ESTABLISHED GRADE FOR THE BOTTOM OF THE PIPE.

C = ORDINARY BEDDING, CAREFULLY SHAPE THE FOUNDATION SOIL TO FIT THE LOWER PART OF THE PIPE EXTERIOR TO A DEPTH OF AT LEAST 15% OF THE OUTSIDE DIA. FOR CIRCULAR PIPES, AND AT LEAST 50% OF THE HEIGHT OF ARCH PIPE.

MINNEAPOLIS DESIGN REFERENCE
MNDOT DRAINAGE MANUAL
SECTION 2.5; AUGUST 30, 2000
NOT TO SCALE

MINNEAPOLIS
DEPARTMENT OF PUBLIC WORKS

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EMBANKMENT FILL HEIGHT FOR CONCRETE PIPE

STANDARD PLATE NO. SEWR-6004