① CONCRETE CULVERT PIPE CLASS "B" BEDDING				
DIAMETER OF PIPE 'D' Inches	(H) MAXIMUM ALLOWABLE COVER IN FEET			
	1500D	2000D	3000D	3750D
18	11	13	20	25
24	12	14	21	26
36	13	16	23	28
48	14	16	24	29
60	14	17	24	29
72	14	17	24	30
84	15	17	25	30
96	15	18	25	31
108	15	18	26	32

② CONCRETE CULVERT PIPE CLASS "C" BEDDING				
DIAMETER OF PIPE 'D' Inches	(H) MAXIMUM ALLOWABLE COVER IN FEET			
	1500D	2000D	3000D	3750D
18	9	12	18	22
24	10	13	19	23
36	11	14	20	24
48	11	15	21	25
60	12	15	21	26
72	12	16	22	26
84	13	16	22	27
96	13	16	23	27
108	13	17	23	28

SPECIAL NOTE:

Special installations may be designed to exceed indicated maximum allowable cover by specific modification of one or more of the following conditions:

1. Bedding class
2. Pipe strength (including special design pipe)
3. Type of backfill or cover material
4. Compaction requirements for backfill or cover material
5. Controlled trench width

Where site conditions favor such modifications significant economy may result from special design installations and these should be considered. Special designs shall specify particular modification of construction requirements or design criteria as applicable. Necessary modifications of normal requirements will not ordinarily be paid for separately but will be included in the price bid for that culvert pipe.

GENERAL NOTES:

The maximum allowable cover values indicated hereon for the various kind of pipe culvert installations are design values based on current Standard and Supplemental Specifications and normal conditions.

When unclassified pipe is specified, it is the contractor's responsibility to furnish and install a class of pipe meeting the requirements on the chart.

Minimum allowable cover for roadway culverts is 2'–0" and 1'–0" for entrance culverts.

Refer to tabulation of culvert installations and other detail project plans as well as appropriate Standard Road Plans for additional information regarding individual culvert installations.

Where a pipe size not listed in the table is required, the 'H' indicated for the next smaller size shown shall apply.

DESIGN CRITERIA

The height of cover tables have been prepared from data in the "Concrete Pipe Design Manual" published by the American Concrete Pipe Association using the values listed below.

FOR EMBANKMENT CONDITIONS

Fill Material Density	=	w = 120 lbs. per cu. ft.
Settlement Ratio	=	rsd = +0.5
*	=	ku = 0.13
Projection Ratio	=	P = 0.9 (Class "C" bedding)
	=	P = 0.7 (Class "B" bedding)
Factor of Safety	=	F.S. = 1.33 on Ultimate Strength

* Using a ratio of lateral to vertical earth pressure (k) of 0.37 (saturated yellow clay) and a coefficient of internal friction (u) of 0.34.

NOTE:

The data shown hereon has been calculated for concrete pipe placed under embankment conditions. The values shown hereon for H do not apply to design and installation of sanitary sewer except where sanitary sewer would be placed under embankment condition.

Iowa Department of Transportation
Project Development Division

STANDARD ROAD PLAN RF-31

REVISION: Place in CADD and update General Notes.	REVISION NO. 1
11-18-94 APPROVED BY DESIGN METHODS ENGINEER	REVISION DATE 03-28-95

DEPTH OF COVER TABLES FOR CONCRETE PIPE